MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE.

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INTRODUCTION.

The SUMMARY for the year 1896 is based upon data received from about 3,000 stations occupied by regular and voluntary observers of the Weather Bureau, Canadian data received by the cooperation of Prof. R. F. Stupart, and Mexican data received by the cooperation of Dr. M. Bárcena, the Director of the Central Meteorological Observatory of Mexico. The statistical tables have been generally prepared by the Division of Records and Meteorological Data, A. J. Henry, Chief of Division. The text and editorial work are by Prof. Cleveland Abbe unless otherwise specifically noted.

GENERAL CLIMATIC CONDITIONS.

ATMOSPHERIC PRESSURE.

The mean pressure for 1896 is shown numerically in Tables I and II. The method of reduction to sea level and the omission of the correction for gravity, as explained by Prof. H. A. Hazen in the MONTHLY WEATHER REVIEW for 1894, Vol. XXII, page 538, have continued in use in the Weather Bureau during 1896, and the figures given in Tables I and II, as also those on Chart I, accord therewith. Owing to the variations of gravity with latitude and altitude, the readings of the mercurial barometer, after being corrected for instrumental temperature and index error, need a further correction or reduction to standard gravity in order to represent the true atmospheric pressure, as measured by a uniform standard. As the international conferences of meteorologists have uniformly urged the application of the reduction to standard gravity and the further reduction to sea level by the tables and methods of the International Meteorological Committee, the Editor has requested Mr. Park Morrill to make the corresponding corrections and reductions. The general method of doing this is explained in the MONTHLY WEATHER REVIEW for 1895, Vol. XXIII, pages 492–494; the results for 1896 are shown in the accompanying table and on Chart IV.

These charts cover the stations of the United States and Canada and can easily be extended over Mexico when the annual mean values for stations in that country become available.

As the general motions of the lower atmosphere depend intimately upon those of the upper atmosphere, it is important to study the isobars and temperatures at elevations of 10,000 feet or more. Assuming a general average decrement of temperature at the rate of 2° F. per 1,000 feet (0.37° C. per 100 meters), the reduction upward can easily be made by using Table B, MONTHLY WEATHER REVIEW, for 1895, page 494, as computed by Mr. Morrill. By a slight change in the first column, which gives the temperature argument, this table becomes applicable to reduction upward to 10,000 feet for any rate of diminution of temperature with altitude and is reprinted as Table F of the present SUMMARY. The resulting isobars are shown on Chart V. On the other hand, with any adopted rate of diminution of temperature, pressures may be reduced upward to the level of 5,000 meters, or 16,404 feet, by means of the table on page 419 of the MONTHLY WEATHER REVIEW for November, 1896, as computed by Koeppen.

The data on Chart I show that the reduced barometric means not corrected for gravity were highest in the east Gulf and South Atlantic States and lowest in southern Arizona, but nearly as low in Newfoundland.

The data on Charts IV and V show that the true pressure gradients at sea level differ appreciably from the apparent pressure gradients on Chart I. They also show that the high-level gradients are steeper and that, therefore, the currents of air are swifter than at sea level. Both the high-level and sea-level gradients and winds and temperatures represent the result of the interaction of ascending and descending currents. If there were no such vertical interchange of air the contrasts between the upper and lower systems would be still stronger. The resultant surface winds are shown on Chart I, and should be compared with both the sea-level and the upper-level isobars. It is very desirable that the wind currents at the 10,000-foot level should be brought under observation in order to compare these directly with the isobars. The observations of cloud motions are only approximately satisfactory, and the true wind directions obtained by kites or free balloons are preferable.

AREAS OF HIGH AND LOW PRESSURE FOR 1896.

The location of an area of high or low pressure is, to a limited extent, affected by the method adopted in the reduction of the barometer to sea level. The following summary, therefore, holds good, especially in connection with the method adopted by the Weather Bureau for the past few years. The average daily and hourly movements of the centers of the areas are given by paths and by days in the individual tables of the successive MONTHLY WEATHER REVIEWS, and the monthly sums are collected together in the following table for the purpose of taking the annual means by paths and by days.

These averages show the same peculiarity as do those for the year 1895, namely that the means taken by days are in both cases smaller than those by paths; that is to say, when each path is given the same weight, no matter whether it is

a long one or a short one, the numerous paths of rapid movement and short duration, outweigh those of slow movement and long duration. If the movement of a center of high or low pressure depends upon the general movement of the upper layers of atmosphere, or is in any way a partial index to the velocity of the general circulation, then from that point of view, the averages taken by days are to be preferred. The average daily movement in 1895 was 556 miles for the high areas and 598 for the low, or an average of 577; in the current year the above table shows average daily velocities in both cases 5 miles larger than the preceding year, giving an average of 582, or about 24 miles per hour. This average undoubtedly gives us a first approximation to the annual average velocity of the wind at some upper level, probably between 5,000 and 10,000 feet, but nearer the latter. If studied in connection with a system of upper isobars such as that shown on Chart VII, of the November REVIEW, they seem to harmonize with the general statement that our high and low areas and weather changes form part of the system of circulation around the north Polar Region of low pressure.

TABLE A.—*Movements of areas of high and low pressure for* 1896.

Month.	High areas.				Low areas.			
	By paths.		By days.		By paths.		By days.	
	No.	Movement.	No.	Movement.	No.	Movement.	No.	Movement.
		Miles.		*Miles.*		*Miles.*		*Miles.*
January	10	5,317	45.5	21,880	9	5,435	38.0	21,830
February	14	9,931	50.0	23,950	7	4,447	34.5	20,260
March	8	4,512	39.0	22,460	10	6,698	42.0	26,760
April	6	3,066	36.0	13,430	9	5,098	36.5	20,330
May	7	3,941	33.0	18,530	10	5,075	41.5	19,960
June	7	3,965	44.5	24,470	8	4,690	35.0	20,350
July	7	3,734	22.0	11,660	11	6,302	38.5	22,550
August	6	3,294	39.0	20,950	10	6,617	34.0	22,360
September	7	4,148	39.0	22,900	11	6,631	39.0	22,320
October	10	5,244	44.0	22,530	9	4,882	35.0	18,060
November	5	3,307	22.5	13,810	8	6,491	33.5	25,250
December	8	4,754	32.5	18,390	12	9,171	43.0	31,530
Sums	95	55,123	437.0	244,950	114	71,407	450.5	271,560
Mean daily velocity	580		561		626		603	
Mean hourly velocity	24.2		23.4		26.1		25.1	

TEMPERATURE.

The mean annual temperature is shown by the isotherms on Chart I. These temperatures relate to the surface of the ground, and the individual figures are given in Table I of the annual meteorological summary of data for Weather Bureau stations. The lowest annual averages within the United States were: Williston, 37.6; Moorhead, 37.7; Bismarck, 38.9; Sault Ste. Marie, 39.5; Duluth, 39.6; Havre, 39.7. For Canada: Prince Albert, 30.5; Battleford, 31.1; White River, 31.2; Minnedosa, 31.6. The highest averages were: Key West, 76.4; Jupiter, 73.4; Yuma, 73.1; Tampa, 71.4; for Canada, Halifax, 43.2; Charlottetown, 43.1; Yarmouth, 43.0.

The mean annual temperature was above the normal at nearly all stations. The largest departures were in the middle Slope and the west Gulf States. The annual temperatures were below normal in the Florida Peninsula and on the north Pacific Coast and in portions of New England.

The maximum temperatures are shown both by the figures in Table I and the full lines on Chart II; the minimum temperatures of the year are shown by the figures in Table I and the dotted lines on the same chart. The absolute range of temperature during the year is easily obtained by comparing the full and dotted lines on this chart. In general maximum temperatures exceeding 105, occurred as follows: Yuma, 117; Phœnix, 115; Fresno, 111; Red Bluff, 109; Fort Smith, 107; Shreveport and Wichita, 106. The absolute maximum for the whole country was 117 at Yuma. Minimum temperatures of —25 or more occured at: Havre, —33; Lander, —31; Northfield, —30; Moorhead, —28; Williston and Idaho Falls, —26; Sault Ste. Marie, Duluth, Miles City, —25.

The regions of large annual ranges of temperature were, as usual, the north, middle, and south Pacific slopes and the Missouri Valley. The stations of small annual range were: Hatteras, 76; Key West, 38; Tatoosh Island, 48; Eureka, 45; Point Reyes Light, 51.

The accumulated departures of average monthly temperatures from the normal values are given in Table III, and show that there was a steady diminution in the deficit with which the year began in the Atlantic and Gulf States, generally turning into a surplus before the end of the year. In other sections of the country the year began with an excess of temperature which generally increased steadily until the close. The greatest deficits for the year were: —0.77, Florida Peninsula. The greatest excesses for the year were: the middle Slope, +2.07; Abilene, +2.19.

MOISTURE.

The mean temperature of the dew-point and of the mean relative humidity are given in Table I.

For the sake of certain studies in hygiene the mean temperature of the wet-bulb thermometer has been given each month. The thermometer from which this temperature is read is whirled at the rate of about 10 feet per second within the light wooden shelter that protects from direct radiation. The average wet-bulb for the year can be easily inferred from the mean temperature and dew-point of Table I as the wet-bulb reading is approximately midway between these two.

The total quantity of moisture in the air for the current year can be found by the table given on pages 539–540 of the ANNUAL SUMMARY for 1894, and does not differ to any important extent from the figures there given for that year.

PRECIPITATION.

The total annual fall of rain and melted snow for 1896 is shown on Chart III. The greatest precipitation was: Tatoosh Island, 100.8; Astoria, 94.8; Fort Canby, 78.6; East Clallam, 78.1. The least was: Yuma, 2.6; San Diego, 8.7; El Paso, 9.3; Pueblo, 10.8.

An annual rainfall above 60 inches occurred on small portions of the coast of Florida and Alabama, Nova Scotia, and Newfoundland, as also along the entire coast of Oregon and Washington. An annual rainfall of less than 10 inches occurred in southern California, Nevada, Utah and Colorado, western New Mexico, and northern Arizona.

The accumulated departures of total monthly precipitation from the normal values are shown in Table IV, from which it appears that a steadily increasing deficit has prevailed over the Atlantic States, Ohio Valley, and Lake Region; but elsewhere a slight excess has accumulated. The large total annual deficits are the west Gulf States, 12.50; South Atlantic States, 10.70. The largest accumulated excess was north Pacific, 10.10.

WIND.

The prevailing direction of the wind, namely that which occurred most frequently at the two hours of regular observations for telegraphic report, 8 a. m. and 8 p. m. (eastern time) is given in Table I. The annual resultant wind deduced from these same observations without taking into account the force of the wind (which is equivalent to attributing a uniform force to all winds) is given in Table V. These resultants are also presented graphically on Chart I in connection with the barometric means. They should also be compared with the pressures on Charts IV and V to which they are intimately related.

Owing to the great labor of computation the resultant

winds, as deduced from hourly readings of the self-registering anemometers, have not been computed during the year 1896, but the relation between the resultants from two observations per day, and those from twenty-four hourly observations can be estimated by a comparison between Tables V and VI, pp. 544 and 545 of the SUMMARY for 1894.

The general agreement of the resultant winds within any climatological section depends upon the nature of the irregularities in the immediate neighborhood of the station; an intimate agreement can not be expected when stations are so far apart and so variously located as those of the Weather Bureau. In such cases as that of Erie, Cleveland, Sandusky, and Toledo, all similarly located on the south shore of Lake Erie, the agreement is very close, so, also, with Block Island and Nantucket.

FREQUENCY OF THUNDERSTORMS.

The successive MONTHLY WEATHER REVIEWS have given for each day and each State the number of thunderstorms reported by both regular and voluntary observers. Tables VI and VII give a summary of these monthly tables. In order to ascertain the relative frequency of thunderstorms, as explained in the SUMMARY for 1894, it is proper to divide the number of storms reported by the number of stations in order to deduce the average number per station. The results of this division are given in the eighth column of Table B, which shows

TABLE B.—*Frequency of thunderstorms and auroras during* 1896.

State.	Areas in units of 10,000 sq. miles.	Number of stations.		Reduction factor.	Total for 1896.		Frequency per station.	
		Needed.	Reporting.		Thunderstorms.	Auroras.	Thunderstorms.	Auroras.
Alabama	5.1	128	45	2.8	376	0	8.4	0.00
Arizona	11.4	385	30	12.8	213	0	7.1	0.00
Arkansas	5.2	130	40	3.2	465	0	11.6	0.00
California	15.8	395	115	3.4	381	0	3.3	0.00
Colorado	10.4	260	70	3.4	562	7	8.0	0.10
Connecticut	0.5	12	20	0.6	270	38	13.5	1.90
Delaware	0.2	5	6	0.8	111	16	18.5	2.67
District of Columbia	0.01	0.2	2	0.5	33	1	16.5	0.50
Florida	5.9	148	30	4.9	837	0	27.9	0.00
Georgia	5.8	145	45	3.2	343	1	7.6	0.02
Idaho	8.1	215	35	8.3	268	27	8.5	0.77
Illinois	5.5	138	80	1.8	1,441	57	18.0	0.71
Indiana	3.4	85	40	2.4	529	12	13.2	0.30
Indian Territory	6.9	172	5	34.4	36	0	7.2	0.00
Iowa	5.5	138	80	1.7	1,204	72	15.0	0.90
Kansas	8.1	202	65	3.1	792	35	12.2	0.54
Kentucky	3.8	95	40	2.7	375	7	9.4	0.18
Louisiana	4.1	102	45	2.3	781	0	15.1	0.00
Maine	3.5	88	15	5.9	134	97	9.6	6.47
Maryland	1.1	28	30	0.9	496	38	16.5	1.27
Massachusetts	0.8	20	65	0.3	539	95	8.3	1.46
Michigan	5.6	140	70	2.3	879	130	12.6	1.86
Minnesota	8.4	210	60	3.5	839	194	14.0	3.23
Mississippi	4.7	118	45	3.0	564	1	12.5	0.02
Missouri	6.5	162	85	1.0	1,945	17	22.9	0.20
Montana	14.4	360	35	1.4	175	128	5.0	3.66
Nebraska	7.6	190	90	2.4	808	67	9.0	0.74
Nevada	11.2	280	35	8.0	247	12	7.1	0.34
New Hampshire	0.9	22	20	1.1	187	121	9.4	6.05
New Jersey	0.8	20	45	0.4	701	52	15.6	1.16
New Mexico	12.1	302	30	12.1	277	0	9.2	0.00
New York	4.7	118	65	2.0	650	114	10.0	1.75
North Carolina	5.1	128	50	2.6	1,267	2	25.3	0.04
North Dakota	7.5	185	35	6.2	241	224	6.9	6.40
Ohio	4.0	100	125	0.8	2,016	123	16.3	0.06
Oklahoma			18		130	0	7.2	0.00
Oregon	9.5	238	45	5.3	119	1	2.7	0.02
Pennsylvania	4.6	115	70	1.6	868	38	17.3	0.55
Rhode Island	0.1	2	6	0.3	57	15	9.5	2.50
South Carolina	3.4	85	35	2.4	582	0	16.0	0.00
South Dakota	7.6	190	40	4.8	280	70	7.0	1.75
Tennessee	4.6	115	35	3.3	716	5	20.5	0.14
Texas	27.4	686	75	9.1	568	1	7.4	0.04
Utah	8.4	210	25	8.4	226	0	9.0	0.00
Vermont	1.0	25	12	2.1	138	46	11.5	3.84
Virginia	6.1	152	35	4.3	543	7	15.2	0.20
Washington	7.0	175	45	3.9	101	21	2.2	0.48
West Virginia	2.3	58	30	1.9	421	5	14.0	0.17
Wisconsin	5.3	132	55	2.2	895	191	16.3	3.47
Wyoming	9.8	245	10	24.5	45	6	4.5	0.60

that the greatest frequencies per station per year were: Florida, 27.9; North Carolina, 25.3; Missouri, 22.9; Tennessee, 20.5. The smallest frequencies were: California, 3.3; Montana, 5.0; Oregon, 2.7; Washington, 2.2.

The product of the observed number of thunderstorms by the reduction factors given in column five of Table B would give the approximate total number of thunderstorms for the respective States, which total number, of course, depends largely on the area of the State, and is omitted from this table, as it has no meteorological significance as compared with the frequency per station.

FREQUENCY OF AURORAS.

Tables VIII and IX give a summary of the detailed tables of auroral frequency in the respective MONTHLY WEATHER REVIEWS. In the absence of more precise knowledge, it is assumed that the number of observers reporting all auroras is the same as those reporting all thunderstorms; the total number of either class of observers is decidedly less than the total number of those who report rainfall and temperature, and is estimated to be as given in the fourth column of Table B. The total number of auroras reported divided by the number of observing stations for any State gives the relative frequency per station, and this number relates to a physical phenomenon, and is comparable with similar ratios for other parts of the world, provided the aurora is so low as not to be obscured by a cloudy sky. On the other hand, if the auroral light emanate from a region far above the cloud, then a further correction for cloudiness is needed, but this has not been applied in the present case, as the Editor believes that we have no certain proof as to the extreme altitude of the auroras, and that, on the other hand, there are many reasons to believe that the light emanates from the cloud region itself.

The States that report the greatest frequency of auroras per station are: Maine, 6.47; North Dakota, 6.40; New Hampshire, 6.05; Vermont, 3.84; Montana, 3.66; Wisconsin, 3.47; Minnesota, 3.23.

SUNSHINE AND CLEAR SKY.

The successive MONTHLY WEATHER REVIEWS have presented in Table XI the percentages of sunshine, as recorded by self-registers of either the photographic or the thermometric type, and the corresponding chapter in the text has called attention to the systematic differences between the instrumental and the personal observations of the average daily sunshine or clear sky. These differences are, doubtless, in part due to what may be called instrumental and personal peculiarities as affecting the respective records. In addition to these peculiarities we must consider the fact that the photographic register gives essentially a record of the duration of a certain limiting intensity of actinic effect of direct sunshine; the thermometric register gives a record of the duration of certain limiting values of the total heat of direct sunshine plus atmospheric and terrestrial radiation; the personal observation of cloudiness aims to give the percentage of area of clear sky. There is no simple relation between these three classes of data, and yet as the records are often used indiscriminately, each for the other, it becomes interesting to ascertain how nearly they agree. The differences between the instrumental and personal records, as given from month to month, are collected together in the two following tables for the photographic and the thermometric stations respectively. A cursory examination of these tables shows that there is an annual periodicity by reason of which the differences are, in both cases, larger in the summer than in the winter months. This annual period is apparently due to the greater altitude of the sun in the summer season by reason of which both the actinic and the thermal power of the sun's rays is increased, wherefore the instrumental records must be interpreted to mean that, for the same percentage of clear sky as determined by personal estimates, there is, in the summer time, a larger proportion of hours during which the limiting thermal or actinic effect prevails. The stations are arranged from south to north in the order of latitude, that is to say, in the order of

possible duration of sunshine. The differences between instrumental and personal records do not vary at all regularly with latitude in the case of the photographic stations, but do have an appreciable increase with latitude in the case of most of the thermometric stations; we may infer that the change of latitude coupled with the change of local peculiarities of the stations affects the thermometric intensity of solar rays more than it does the actinic intensity.

TABLE C.—*Instrumental records minus personal estimates at photographic stations.*

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual mean.
Galveston	+ 1	− 1	+ 4	+ 9	+ 7	+ 6	+15	+ 8	+ 8	+ 5	− 7	+ 3	4.8
Savannah	+12	+14	+11	+13	+14	+29	+15	+ 6	− 1	+ 5	+ 2	− 3	9.8
Phœnix	+ 5	+17	+22	+11	+ 9	+11	+23	+25	+10	+ 8	+12	+ 6	13.2
San Diego	+ 6	+ 7	+16	+ 6	+ 9	+ 2	− 4	−11	− 4	0	+ 5	+12	3.7
Los Angeles	.....	.....	.....	.....	.....	.....	.....	.....	.....	+ 9	.....	+ 7	.....
Santa Fe	+14	+11	+12	+16	+17	+15	+18	+19	+ 8	+18	+16	+11	14.6
Dodge City	+ 8	+ 7	+12	+ 8	+ 5	+16	+ 8	+ 8	+ 8	+ 8	+ 3	+ 4	7.8
Kansas City	− 3	+ 1	+ 6	+ 5	+12	+10	+ 9	+ 4	+ 5	+ 5	+ 5	− 3	4.6
Washington	0	− 7	0	− 4	+ 5	+ 7	+12	+ 5	+ 1	+ 3	+ 3	+ 8	2.8
Denver	+23	+17	+23	+20	+ 8	+17	+10	+ 7	+ 8	+11	+27	+19	15.8
Cheyenne	.....	.....	.....	.....	.....	.....	.....	.....	+16	+23	+21	+13	.....
Eureka	− 1	+ 7	+ 1	+ 4	+ 6	+ 1	− 2	− 9	+ 4	− 1	+ 2	− 7	0.4
Omaha	.....	.....	.....	.....	.....	.....	.....	+10	+ 9	+ 9	+ 4	.....	.....
Salt Lake City	+15	+20	+22	+28	+27	+34	+31	+23	+29	+12	+19	+24	23.7
Cleveland	− 3	0	+10	+14	+ 9	+13	+13	+11	*	.....	.....	.....	.....
Norfolk	.....	+ 1	+ 8	+ 9	+10	+14	+10	+15	+ 6	+10	+ 1	+ 3	.....
Eastport	+11	+ 4	+ 4	+10	+17	+15	+11	+13	+ 9	+ 7	+ 4	+11	10.5
Portland, Oreg.†	− 9	− 8	0	− 7	− 9	+ 1	+ 5	+10	− 2	+ 1	+12	−11	− 1.6
Bismarck	− 5	− 4	+ 6	− 4	+ 3	+ 7	+ 4	+10	+ 1	− 1	− 1	+ 2	2.2
Helena	− 3	0	+ 1	+ 2	+ 5	+ 3	+ 6	+ 7	+ 6	+ 8	+ 1	+ 4	3.3

* Photographic record ceases; thermometric record begins in November. † Records by both methods.

TABLE D.—*Instrumental records minus personal estimates at thermometric stations.*

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual mean.
Tampa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	− 4	0	.....
New Orleans	+ 1	+ 1	+ 4	+ 2	+ 3	0	+ 1	+ 1	0	2	− 1	+ 3	+ 1.4
Vicksburg	+ 2	+ 4	+ 6	0	+ 5	+ 7	+ 4	+ 6	+ 2	+ 3	+ 2	+13	+ 1.5
Atlanta	+ 4	+ 6	+23	+20	+33	+18	−13	.....	− 3	− 3	− 1	− 2	+ 6.9
Wilmington	+ 1	+ 7	+11	+14	+16	+10	+16	+12	+11	+ 8	0	+ 5	+ 9.2
Chattanooga	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	+ 1	− 5	.....
Little Rock	+ 5	+15	+15	+36	+18	+29	+29	+21	+12	+20	+11	+18	+19.0
Raleigh	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	+ 8	+ 9	.....
Fresno	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	+ 9	+ 3	.....
Louisville	+ 7	+ 5	+14	+26	+22	+38	+ 3	+ 4	+ 6	+ 9	+ 9	+ 3	.....
San Francisco	+ 2	− 1	+ 5	+18	+ 1	+ 7	+ 9	+10	+ 5	+ 3	+ 9	+ 7	+16.3
Baltimore	+ 3	+ 5	+ 3	+ 1	− 2	+ 8	+11	+ 4	+ 4	+10	− 8	+ 3	+14.6
Cincinnati	0	+ 8	+ 8	+23	+24	+24	+27	+19	+19	+19	+ 2	− 4	+ 1.8
St. Louis	+ 7	+11	+10	+19	+19	+22	+16	+12	+14	+ 8	+10	+15	+13.2
Columbus	+ 5	+ 9	+12	+17	+14	+10	+11	+10	+ 7	+12	+ 3	− 7	+13.6
Indianapolis	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	+ 8	+ 7	+ 8.6
Philadelphia	+12	+13	+15	+24	+28	+30	+36	+27	+17	+ 8	+12	+17	.....
New York	+ 3	+10	+ 8	+ 8	+ 3	+ 1	− 1	− 2	+ 1	− 1	+12	+14	+19.9
Binghamton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	− 1	0	+14.7
Boston	+ 4	+ 6	+11	+ 8	+12	+ 5	+ 5	+ 7	+ 9	+ 7	+ 6	+14	+ 3
Chicago	+ 5	+ 8	+11	+ 9	+12	+21	+ 8	+13	+11	+ 5	0	0	+ 7.8
Cleveland.*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	− 6	.....	+ 9.4
Des Moines	+11	+18	+15	+26	+28	+22	+ 3	+ 7	+ 3	+ 8	+ 3	+ 3	.....
Detroit	+ 7	+ 7	+ 7	+10	+16	+ 9	+ 5	+15	+10	+ 3	+ 8	+ 7	+12.2
Dubuque	.....	.....	.....	.....	.....	+26	+25	.....	.....	.....	− 2	− 4	+ 8.7
Albany	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	+12	− 1
Buffalo	+ 8	+16	+17	+14	+10	.....	+28	+33	+14	+ 9	+ 2	− 1	.....
Rochester	+23	+20	+ 9	+13	+18	+ 7	+ 6	+ 5	+ 7	− 3	− 1	+ 2	+ 8.8
Portland, Me.	+17	+10	+12	+19	+13	+22	+23	+19	+15	+ 8	+11	+14	+15.2
Minneapolis†	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Portland, Oreg.‡	− 5	− 7	+ 1	− 7	− 9	0	+ 5	+11	− 2	+ 2	+12	− 3	− 0.6
Seattle	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	− 9	− 3	.....
Independence	.....	+13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* Changed to "T" in November. † No personal record. ‡ Records by both methods.

REDUCTION OF PRESSURES AND TEMPERATURES.

The following table (E) gives the data necessary for computing the mean annual temperatures and pressures reduced to sea level in accordance with the principles explained more fully by Mr. Park Morrill in the SUMMARY for 1895 (Vol. XXIII, page 492). The temperatures are first reduced to sea level by applying the general reduction of 2° F. per 1,000 feet of altitude, plus a station correction determined from a discussion of normal data. These results are charted and a system of smooth isotherms is drawn, such that the individual stations agree usually with the reduced temperatures within a fraction of a degree. The column temperatures used for computing the reduction of pressure to sea level are obtained by subtracting one-half of the above general reduction from the temperatures read off from the system of sea-level isotherms. With these reduction temperatures (in column 7) and the observed station pressures given in column 4 and the mean dew-point in column 6, the reduced barometer is computed by a method based on the formula recommended by the International Meteorological Committee. The pressures given in the 4th column of Table E differ from those in the 2d column of Table I, by reason of the application of the correction for the influence of local gravity, and are, therefore, barometric pressures as distinguished from barometric readings. Similarly the reduced pressures in the 8th column of Table E represent annual sea-level pressures, computed by making due allowance for the influence of the known force of gravity in giving weight to air whose density depends on the temperature and the moisture that is assumed to exist between the station and sea level.

We attain to a more natural system of isobars by reducing pressures upward, since in this case we have to deal with real instead of hypothetical air, whose temperature and moisture can be determined by actual observation instead of arbitrary assumptions, and whose movements are of the greatest importance in the study and prediction of the weather. In the last column of Table E are given the pressures reduced upward to 10,000 feet by the same process that was used for reducing to sea level, and by the help of the small table, F, which is quoted from the SUMMARY for 1895, page 494, but is changed so that the temperature argument is now the column temperature instead of the sea-level temperature.

TABLE E.—*Reduction data for* 1896.

Station.	Elevation.	Latitude.		Mean observed pressure.*	Mean observed temperature.	Mean dew-point.	Mean reduction temperature.	Mean pressure reduced to sea level.	Mean temperature reduced to sea level.	Mean pressure at 10,000 feet altitude.
1	2	3		4	5	6	7	8	9	10
New England.	*Feet.*	°	′	*Inch.*	° *F.*	° *F.*	° *F.*	*Inch.*	° *F.*	*Inch.*
Eastport	76	44	54	29.91	41.3	33	41.4	30.00	41.5	20.52
Portland, Me.	103	43	39	29.89	44.6	38	44.7	30.00	44.8	20.56
Northfield, Vt.	872	44	10	29.09	40.8	34	41.7	30.05	42.6	20.55
Boston, Mass.	125	42	21	29.89	49.2	39	49.3	30.03	49.4	20.67
Nantucket, Mass.	14	41	17	30.02	48.7	43	48.7	30.04	48.7	20.66
Block Island, R. I.	27	41	10	30.01	49.0	43	49.0	30.04	49.0	20.67
New Haven, Conn.	107	41	18	29.92	49.3	40	49.4	30.04	49.5	20.67
Middle Atlantic States.										
Albany, N. Y.	97	42	39	29.95	48.4	40	48.5	30.06	48.6	20.67
New York, N. Y.	314	40	43	29.71	51.2	43	51.5	30.05	51.8	20.71
Harrisburg, Pa.	377	40	16	29.67	52.3	44	52.7	30.07	53.1	20.75
Philadelphia, Pa	117	39	57	29.95	54.5	43	54.6	30.07	54.7	20.77
Baltimore, Md	123	39	18	29.94	55.8	43	55.9	30.06	56.0	20.79
Washington, D. C.	112	38	54	29.96	55.5	44	55.6	30.09	55.7	20.81
Lynchburg, Va.	685	37	25	29.35	57.6	47	58.3	30.08	59.0	20.85
Norfolk, Va.	57	36	51	30.02	60.0	51	60.1	30.08	60.2	20.87
South Atlantic States.										
Charlotte, N. C.	773	35	13	29.25	61.1	48	61.9	30.07	62.7	20.90
Hatteras, N. C.	11	35	15	30.07	62.0	56	62.0	30.09	62.0	20.91
Kittyhawk, N. C.	9	36	00	30.07	60.4	53	60.4	30.08	60.4	20.88
Raleigh, N. C.	375	35	45	29.68	60.7	48	61.1	30.09	61.5	20.90
Wilmington, N. C.	78	34	14	30.01	63.3	54	63.4	30.09	63.5	20.93
Charleston, S. C.	52	32	47	30.06	66.5	58	66.6	30.11	66.7	21.00
Augusta, Ga.	180	33	28	29.89	65.3	53	65.5	30.08	65.7	20.96
Savannah, Ga.	98	32	05	29.99	67.4	57	67.5	30.09	67.6	21.00
Jacksonville, Fla.	43	30	20	30.03	69.6	59	69.6	30.08	69.6	21.02
Florida Peninsula.										
Jupiter, Fla.	28	26	57	30.02	73.4	65	73.4	30.05	73.4	21.06
Key West, Fla.	22	24	34	30.02	76.4	68	76.4	30.04	76.4	21.10
Tampa, Fla.	36	27	57	30.03	71.4	63	71.4	30.06	71.4	21.04
East Gulf States.										
Atlanta, Ga.	1,121	33	45	28.90	62.2	50	63.3	30.09	64.4	20.95
Pensacola, Fla.	56	30	25	30.00	67.9	59	68.0	30.06	68.1	20.98
Mobile, Ala.	57	30	41	30.00	67.2	58	67.3	30.06	67.4	20.97
Montgomery, Ala.	221	32	23	29.84	66.2	55	66.4	30.07	66.6	20.97

TABLE E.—*Reduction data for* 1896—Continued.

Station.	Elevation.	Latitude.	Mean observed pressure.*	Mean observed temperature.	Mean dew-point.	Mean reduction temperature.	Mean pressure reduced to sea level.	Mean temperature reduced to sea level.	Mean pressure at 10,000 feet altitude.
1	2	3	4	5	6	7	8	9	10
East Gulf States—Con.	*Feet.*	° ′	*Inch.*	° *F.*	° *F.*	° *F.*	*Inch.*	° *F.*	*Inch.*
Vicksburg, Miss.	254	32 22	29.77	66.8	54	67.1	30.04	67.4	20.96
New Orleans, La	54	29 58	30.00	69.4	60	69.5	30.06	69.6	21.01
West Gulf States.									
Shreveport, La	249	32 30	29.77	67.0	54	67.2	30.03	67.4	20.95
Fort Smith, Ark	481	35 22	29.50	63.2	50	63.7	30.01	64.2	20.89
Little Rock, Ark	302	34 45	29.73	63.4	51	63.7	30.05	64.0	20.91
Corpus Christi, Tex	20	27 49	29.99	70.0	65	70.0	30.01	70.0	20.98
Galveston, Tex	42	29 18	30.00	70.2	62	70.2	30.04	70.2	21.00
Palestine, Tex	510	31 45	29.50	67.5	54	68.0	30.03	68.5	20.97
San Antonio, Tex	704	29 27	29.28	69.9	55	70.6	30.01	71.3	21.00
Ohio Val. & Tennessee.									
Chattanooga, Tenn	762	35 04	29.29	61.5	49	62.3	30.10	63.1	20.94
Knoxville, Tenn.	980	35 56	29.06	59.6	48	60.6	30.09	61.6	20.90
Memphis, Tenn	399	35 09	29.63	63.1	52	63.5	30.06	63.9	20.92
Nashville, Tenn	545	36 10	29.50	60.3	48	60.8	30.08	61.3	20.89
Lexington, Ky	989	38 02	29.01	55.9	44	56.9	30.06	57.9	20.82
Louisville, Ky	525	38 15	29.50	58.1	45	58.6	30.06	59.1	20.84
Indianapolis, Ind	823	39 46	29.18	54.1	43	54.9	30.07	55.7	20.79
Cincinnati, Ohio	628	39 06	29.40	55.6	43	56.2	30.08	56.8	20.81
Columbus, Ohio	894	39 58	29.18	53.0	44	53.8	30.07	54.6	20.78
Pittsburg, Pa	842	40 32	29.17	53.3	46	54.1	30.07	54.9	20.78
Parkersburg, W. Va	638	39 16	29.40	54.6	45	55.2	30.09	55.8	20.81
Lower Lake Region.									
Buffalo, N. Y.	768	42 53	29.21	47.1	38	47.8	30.05	48.5	20.66
Oswego, N. Y.	335	43 29	29.66	45.9	38	46.2	30.02	46.5	20.61
Rochester, N. Y.	523	43 08	29.47	47.7	38	48.2	30.04	48.7	20.66
Erie, N. Y	714	42 07	29.28	49.1	41	49.8	30.06	50.5	20.70
Cleveland, Ohio	762	41 30	.....	.....	.....	.....	.....	.....	.....
Sandusky, Ohio	629	41 25	29.36	50.8	42	51.4	30.04	52.0	20.71
Toledo, Ohio	674	41 40	29.32	50.0	42	50.7	30.05	51.4	20.71
Detroit, Mich	730	42 20	29.25	48.6	40	49.3	30.05	50.0	20.68
Upper Lake Region.									
Alpena, Mich.	609	45 05	29.35	43.0	36	43.6	30.02	44.2	20.57
Grand Haven, Mich	628	43 05	29.33	47.3	40	47.9	30.02	48.5	20.64
Marquette, Mich	734	46 34	29.18	42.0	34	42.7	29.99	43.4	20.54
Port Huron, Mich	639	43 00	29.35	46.8	39	47.4	30.05	48.0	20.66
Sault Ste. Marie, Mich	624	46 28	29.32	39.5	33	40.1	30.02	40.7	20.51
Chicago, Ill	824	41 52	29.15	49.8	40	50.6	30.04	51.4	20.70
Milwaukee, Wis	670	43 02	29.30	47.2	40	47.9	30.04	48.6	20.66
Green Bay, Wis	617	44 31	29.36	45.0	36	45.6	30.04	46.2	20.62
Duluth, Minn	702	46 48	29.23	39.6	32	40.3	30.01	41.0	20.51
North Dakota.									
Moorhead, Minn	935	46 52	28.97	37.7	30	38.6	30.01	39.5	20.49
Bismarck, N. Dak	1,674	46 47	28.22	38.9	26	40.3	30.05	42.0	20.55
Williston, N. Dak	1,875	48 09	27.98	37.6	28	38.6	30.02	40.5	20.51
Upper Mississippi Valley.									
St. Paul, Minn	837	44 58	29.10	44.0	34	44.8	30.01	45.7	20.59
Davenport, Iowa	599	41 30	29.37	50.8	40	51.4	30.02	52.0	20.70
Des Moines, Iowa	867	41 35	29.11	50.1	39	51.0	30.05	51.9	20.71
Keokuk, Iowa	614	40 22	29.37	53.0	42	53.6	30.03	54.2	20.74
Cairo, Ill	359	37 00	29.66	59.4	49	59.8	30.04	60.2	20.84
Springfield, Ill	644	39 48	29.36	53.7	43	54.3	30.05	54.9	20.75
Hannibal, Mo	534	39 41	29.46	54.2	44	54.7	30.03	55.2	20.76
St. Louis, Mo.	567	38 38	29.45	57.9	47	58.5	30.06	59.1	20.84
Missouri Valley.									
Kansas City, Mo	963	39 05	29.01	55.4	45	56.4	30.04	57.4	20.80
Springfield, Mo	1,324	37 12	28.63	56.8	46	58.1	30.02	59.4	20.82
Omaha, Nebr	1,103	41 16	28.84	51.2	40	52.3	30.02	53.4	20.72
Pierre, S. Dak	1,460	44 24	28.42	45.9	33	46.0	29.99	47.5	20.60
Huron, S. Dak	1,310	44 21	28.60	42.8	32	45.4	30.01	46.7	20.60
Northern Slope.									
Havre, Mont	2,477	48 34	27.34	39.7	28	41.6	29.98	44.1	20.54
Miles City, Mont	2,372	46 25	27.45	43.4	30	45.3	29.96	47.7	20.59
Helena, Mont	4,108	46 34	25.83	43.6	27	47.6	30.05	51.7	20.71
Rapid City, S Dak	3,260	44 04	26.58	46.7	30	47.7	29.97	51.0	20.65
Cheyenne, Wyo	6,105	41 08	23.98	45.7	26	51.0	29.98	57.1	20.75
Lander, Wyo	5,372	42 50	24.63	43.0	25	48.0	30.01	53.4	20.71
North Platte, Nebr	2,826	41 08	27.06	49.8	37	52.5	30.00	55.3	20.74
Middle Slope.									
Denver, Colo	5,290	39 45	24.71	51.6	27	54.8	29.94	60.1	20.77
Pueblo, Colo	4,713	38 18	25.24	53.1	24	56.4	29.93	61.1	20.78
Concordia, Kans	1,398	39 35	28.51	54.4	42	56.3	29.99	57.7	20.77
Dodge City, Kans	2,504	37 45	27.37	56.4	39	59.2	29.93	61.7	20.79
Wichita, Kans	1,351	37 41	28.57	58.0	44	59.7	29.99	61.1	20.82
Oklahoma, Okla	1,218	35 26	28.71	61.0	48	61.9	29.99	63 1	20.86
Southern Slope.									
Abilene, Tex	1,749	32 23	28.19	65.6	47	66.4	29.98	68.1	20.93
Amarillo, Tex	3,691	35 13	26.94	57.2	36	60.6	29.95	64.3	20.84
Southern Plateau.									
El Paso, Tex	3,767	31 47	26.16	64.3	31	66.5	29.90	70.3	20.91
Santa Fe, N. Mex	6,998	35 41	23.27	50.1	21	57.4	29.96	64.4	20.86
Phœnix, Ariz	1,076	33 28	28.74	70.2	42	71.3	29.84	72.4	20.90
Yuma, Ariz	189	32 45	29.72	73.1	43	73.2	29.86	73.3	20.93
Middle Plateau.									
Carson City, Nev	4,790†	39 08	25.28	50.3	29	55.0	30.00	59.7	20.81
Winnemucca, Nev	4,340	40 58	25.65	49.5	23	56.4	30.02	60.7	20.84
Salt Lake City, Utah	4,344	40 46	25.64	51.5	34	55.5	30.01	59.8	20.82
Northern Plateau.									
Baker City, Oreg	3,470	44 50	26.43	46.4	32	53.0	30.00	56.5	20.76
Idaho Falls, Idaho	4,742	43 29	25.24	44.4	30	48.9	30.04	53.6	20.74
Spokane, Wash	1,943	47 40	.....	.....	.....	.....	.....	.....	.....
Walla Walla, Wash	1,018	46 02	28.93	53.5	41	51.9	30.02	52.9	20.71
North Pacific Coast.									
Fort Canby, Wash	179	46 16	29.82	50.2	46	50.4	30.02	50.6	20.67
Seattle, Wash	119	47 38	29.89	51.1	43	51.2	30.02	51.3	20.69
Tatoosh Island, Wash	86	48 23	29.91	48.0	43	48.1	30.00	48.2	20.62
Portland, Oreg	158	45 32	29.86	52.6	42	52.8	30.03	53.0	20.73
Roseburg, Oreg	521	43 13	29.44	53.2	42	53.7	30.01	54.2	20.72
Middle Pacific Coast.									
Eureka, Cal	64	40 48	30.00	52.3	47	54.5	30.07	54.6	20.77

TABLE E.—*Reduction data for* 1896—Continued.

Station.	Elevation.	Latitude.	Mean observed pressure.*	Mean observed temperature.	Mean dew-point.	Mean reduction temperature.	Mean pressure reduced to sea level.	Mean temperature reduced to sea level.	Mean pressure at 10,000 feet altitude.
1	2	3	4	5	6	7	8	9	10
Mid. Pacific Coast—Con.	*Feet.*	° ′	*Inch.*	° *F.*	° *F.*	° *F.*	*Inch.*	° *F.*	*Inch.*
Red Bluff, Cal	334	40 10	29.63	62.5	42	56.3	29.99	56.6	20.75
Sacramento, Cal	71	38 35	.....	.....	.....	.....	.....	.....	.....
San Francisco, Cal	153	37 48	29.86	55.9	48	56.1	30.03	56.3	20.77
South Pacific Coast.									
Fresno, Cal	332	36 43	29.61	63.7	44	61.5	29.96	61.8	20.81
Los Angeles, Cal	330	34 03	29.61	63.1	49	63.1	29.96	63.4	20.84
San Diego, Cal	69	32 43	29.90	61.9	52	64.4	29.97	64.5	20.86
San Luis Obispo, Cal	201	35 18	29.79	59.3	46	59.5	30.01	59.7	20.82
Canadian Stations.									
St. Johns, N. F	125	47 34	29.79	40.5	....	40.6	29.98	40.7	20.45
Sydney, C. B. I	55	46 10	29.90	41.9	....	42.0	29.96	42.1	20.50
Halifax, N. S	118	44 39	29.89	43.2	....	43.3	30.02	43.4	20.56
Grand Manan, N. B	49†	44 47	29.98	42.0	....	42.0	30.03	42.0	20.54
Yarmouth, N. S	65	43 50	29.92	43.0	....	43.1	29.99	43.2	20.54
Charlottetown, P. E. I	38†	46 14	29.92	43.1	....	43.1	29.96	43.1	20.52
Chatham, N. B	21	47 03	29.96	36.6	....	36.6	29.98	36.6	20.42
Father Point, Que	20	48 31	29.95	34.0	....	34.0	29.97	34.0	20.37
Quebec, Que	296	46 48	29.66	37.0	....	37.3	30.00	37.6	20.44
Montreal, Que	187	45 30	29.80	40.7	....	40.9	30.01	41.1	20.51
Rockliffe, Ont	472	46 12	29.49	36.5	....	37.0	30.02	37.5	20.46
Kingston, Ont	285	44 13	29.70	42.4	....	42.7	30.01	43.0	20.54
Toronto, Ont	350	43 39	29.65	44.4	....	44.8	30.03	45.1	20.59
White River, Ont	1,252	48 20	28.64	31.2	....	33.6	30.03	34.9	20.42
Port Stanley, Ont	592	42 40	29.39	45.0	....	45.6	30.04	46.2	20.68
Saugeen, Ont	656	44 30	29.30	43.1	....	43.8	30.02	44.5	20.58
Parry Sound, Ont	635	49 15	29.32	40.4	....	41.0	30.02	41.6	20.59
Port Arthur, Ont	644	48 27	29.28	34.8	....	35.4	30.01	36.0	20.42
Winnipeg, Man	760	49 53	29.14	32.6	....	33.4	29.99	34.2	20.38
Minnedosa, Man	1,690	50 10	28.15	31.6	....	34.1	30.01	35.8	20.42
Qu'Appelle, Assin	2,115	50 44	27.69	31.5	....	33.8	30.00	35.9	20.42
Medicine Hat, Assin	2,161	50 01	27.64	38.8	....	40.4	29.96	42.6	20.50
Swift Current, Assin	2,439	50 20	27.38	36.0	....	37.7	30.01	40.1	20.50
Calgary, Alberta	3,389	51 02	26.36	34.6	....	38.0	29.94	41.4	20.47
Prince Albert, Sask	1,402	53 55	28.41	30.5	....	32.8	29.96	34.2	20.36
Edmonton, Alberta	2,158	53 34	27.64	33.1	....	36.2	29.98	38.4	20.45
Battleford, Sask	1,620	52 41	28.24	31.1	....	32.9	30.03	34.5	20.41
Hamilton, Ber	151	32 23	29.94	69.6	....	69.8	30.10	70.0	21.04
Esquimalt, B. C	27	48 26	29.97	32.9	....	32.9	30.00	32.9	20.36

* The mean barometer of Table I plus the reduction to standard gravity.
† Barometric altitude.

TABLE F.—*Reduction of pressures from sea level to* 10,000 *feet.*

Column temperature.	Sea-level pressures in inches.												
	29.86.	29.88.	29.90.	29.92.	29.94.	29.96.	29.98.	30.00.	30.02.	30.04.	30.06.	30.08.	30.10.
° *F.*													
22	20.26	20.28	20.29	20.30	20.31	20.33	20.34	20.35	20.37	20.38	20.39	20.41	20.42
26	.32	.34	.35	.37	.38	.39	.41	.42	.43	.45	.46	.48	.49
30	.39	.40	.42	.43	.45	.46	.47	.49	.50	.51	.53	.54	.56
34	.46	.47	.48	.50	.51	.53	.54	.55	.57	.58	.59	.61	.62
38	.52	.54	.55	.56	.58	.59	.60	.62	.63	.65	.66	.67	.69
42	.59	.60	.61	.63	.64	.66	.67	.68	.70	.71	.72	.74	.75
46	.65	.66	.68	.69	.71	.72	.73	.75	.76	.78	.79	.80	.82
50	.72	.73	.74	.76	.77	.78	.80	.81	.83	.84	.85	.87	.88
54	.78	.79	.81	.82	.83	.85	.86	.88	.89	.90	.92	20.93	20.95
58	.84	.86	.87	.88	.90	.91	.93	20.94	20.95	20.97	20.98	21.00	21.01
62	20.91	20.92	20.94	20.95	20.96	20.98	20.99	21.00	21.02	21.03	21.05	21.06	21.08

If the student desires to reduce the pressures upward to 5,000 meters, he can easily do so by the use of the table given by Koeppen and published in the MONTHLY WEATHER REVIEW, November, 1896, page 419.

The sea-level isobars of Chart IV show that the distribution of pressure for 1896 has not been appreciably different from that for 1895; the area of highest pressure over the South Atlantic States and the high pressure off the coasts of Washington and Oregon are portions of a ridge that crosses the continent and constitutes a portion of the so-called tropical belt around the whole Northern Hemisphere. To the north of this in 1896 the low pressure in the Lake Region and Canada was about normal as to location and intensity; to the south the low pressure over the Gulf of California was nearly the same as in 1895 and differs but little from the normal given by Buchan in his report on atmospheric circulation. At the northwest end of this ridge the pressure on the coast of Washington and Oregon averaged 0.02 less than in 1895; at the southeast end the pressure on the coast of Georgia and the Carolinas averaged 0.02 more than in 1895.

TABLE I.—*Annual meteorological summary, Weather Bureau stations*, 1896.

Districts and stations.	Elevation of barometer above sea level.	Pressure in inches.†			Temperature of the air in degrees Fahrenheit.							Mean temperature of the dew point.	Mean relative humidity, per cent.	Precipitation.			Wind.				Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall, in inches.‡
		Mean actual, 8 a. m.+8 p. m.+2.	Mean reduced.	Departure from normal.	Mean max. +min.+2.	Departure from normal.	Maximum.	Mean Maximum.	Minimum.	Mean minimum.	Greatest monthly range.			Total, in inches.	Departure from normal.	Days with .01, or more.	Total movement, miles.	Prevailing direction.	Max. velocity. Miles per hour.	Max. velocity. Direction.					
New England.																									
Eastport, Me.	76				44.6	−1.7	92	52	−13	37	58	38	79	45.44	+ 3.06	146	67,152	n.	42	n.	102	109	155	6.1	77.1
Portland, Me.	103	29.89	30.00	+ .02	40.8	−0.2	91	51	−30	30	72	34	78	33.82	− 1.99	147	77,397	s.	46	n.	69	141	156	6.5	89.8
Northfield, Vt.	872	29.09	30.05	+ .04	49.2	+0.3	95	57	−11	42	67	39	72	37.55	− 7.54	136	103,375	w.	58	se.	133	98	135	5.4	38.9
Boston, Mass.	125	29.90	30.04	+ .04	48.7	+0.1	86	54	− 1	43	53	43	82	33.17	− 7.67	150	110,537	sw.	62	ne.	128	103	135	5.5	32.1
Nantucket, Mass.	14	30.03	30.04	+ .01	48.3	−1.2	87	53	− 6	43	56	.....	.....	41.03	− 3.72	119	138,168	sw.	58	nw.	177	82	107	4.4	33.9
Woods Hole, Mass.	.....	.....	.....	.....	51.4	+0.1	92	59	− 4	44	69	.....	.....	46.70	+ 5.18	127	86,383	sw.	.....	.....	109	99	158	.....	27.8
Vineyard Haven, Mass.	.....	.....	.....	.....	49.0	−0.3	86	54	− 4	44	53	43	81	44.59	+ 0.25	128	150,792	sw.	80	ne.	80	193	93	5.7	36.4
Block Island, R. I.	27	30.02	30.05	+ .02	48.3	−0.2	92	56	−12	40	62	.....	.....	38.65	− 8.85	105	.....	s.	.....	.....	206	35	125	.....	29.5
Narragansett Pier, R. I.	.....	.....	.....	.....	49.3	−0.1	94	58	−11	41	64	40	74	38.39	− 9.66	130	85,818	n.	54	e.	149	82	135	5.2	35.1
New Haven, Conn.	107	29.93	30.05	+ .01	49.3	−0.1	94	58	−11	41	64	40	74	38.39	− 9.66	130	85,818	n.	54	e.	149	82	135	5.2	35.1
Middle Atlantic States.																									
Albany, N. Y.	97	29.96	30.07	+ .05	48.4	+0.2	95	57	−16	40	67	40	77	37.88	−10.07	130	72,445	s.	48	e.	118	128	120	5.7	51.6
New York, N. Y.	314	29.72	30.06	+ .01	51.2	−0.8	94	58	− 6	44	67	43	77	37.99	− 6.94	124	125,289	nw.	72	nw.	134	118	114	5.3	42.0
Harrisburg, Pa.	377	29.67	30.09	+ .02	52.3	+0.8	95	60	− 1	45	68	44	76	35.06	− 9.10	121	65,491	w.	72	s.	110	107	149	5.7	56.7
Philadelphia, Pa.	117	29.96	30.08	+ .02	54.5	+0.6	97	62	− 2	47	65	43	69	32.15	− 7.80	112	91,897	nw.	53	n.	120	110	136	5.6	14.8
Baltimore, Md.	123	29.95	30.08	+ .01	55.8	+0.5	98	64	5	48	63	43	67	38.59	− 5.49	115	60,249	sw.	50	s.	97	136	133	5.7	17.0
Washington, D. C.	112	29.98	30.10	+ .02	55.5	+0.5	96	65	8	46	65	44	72	31.16	−12.43	124	61,242	s.	66	se.	148	100	118	4.8	9.3
Cape Henry, Va.	.....	.....	.....	.....	59.6	+1.0	100	67	10	52	62	.....	.....	47.07	− 5.76	107	119,726	se.	.....	.....	119	117	130	.....	3.2
Lynchburg, Va.	685	29.37	30.11	+ .03	57.6	+0.3	98	67	6	48	65	47	74	46.64	+ 3.67	125	37,113	sw.	34	nw.	138	116	112	5.0	12.4
Norfolk, Va.	57	30.04	30.10	+ .03	60.0	+0.6	98	68	11	52	62	51	79	44.22	− 8.00	118	77,558	sw.	56	sw.	149	95	122	5.1	5.7
South Atlantic States.																									
Charlotte, N. C.	778	29.28	30.10	+ .02	61.1	+0.8	99	71	6	51	64	48	69	34.78	−17.30	97	59,393	s.	42	sw.	166	134	76	4.4	2.0
Hatteras, N. C.	11	30.10	30.11	+ .04	62.0	+0.4	91	67	15	57	51	56	83	45.25	−21.23	114	121,753	sw.	67	n.	136	139	91	4.8	T.
Kittyhawk, N. C.	9	30.09	30.10	+ .04	60.4	+0.2	95	67	11	54	57	53	82	51.43	− 4.94	104	130,589	sw.	72	ne.	1854	984	794	4.1	5.0
Raleigh, N. C.	375	29.71	30.11	+ .01	60.7	+1.4	99	70	8	51	64	48	70	43.91	−11.76	111	53,707	sw.	34	sw.	126	133	107	5.1	7.5
Wilmington, N. C.	78	30.04	30.13	+ .05	63.3	−0.1	98	72	12	55	60	54	79	40.42	−14.04	113	74,850	sw.	48	sw.	150	153	63	4.4	12.1
Charleston, S. C.	52	30.09	30.14	+ .05	66.5	+0.2	98	73	18	60	54	58	80	47.78	− 9.08	102	72,327	sw.	62	s.	130	179	57	4.5	T.
Columbia, S. C.	.....	.....	.....	.....	64.5	+0.8	104	76	10	53	68	.....	.....	41.89	− 6.87	91	.....	ne.	.....	.....	143	139	84	.....	0.6
Augusta, Ga.	180	29.92	30.11	+ .04	65.8	+0.5	101	76	15	55	60	53	72	43.45	− 5.02	102	48,412	se.	48	sw.	153	117	96	4.6	T.
Savannah, Ga.	98	30.02	30.13	+ .06	67.4	+0.5	101	77	21	58	54	57	78	44.24	− 7.78	102	68,637	s.	75	se.	173	108	85	4.6	T.
Jacksonville, Fla.	43	30.07	30.12	+ .04	69.6	−0.1	100	79	24	60	53	59	78	40.19	−14.05	111	63,198	ne.	70	se.	161	130	66	4.4	0.0
Florida Peninsula.																									
Jupiter, Fla.	28	30.07	30.10	+ .02	73.4	−1.2	93	79	37	68	46	65	79	53.26	− 4.81	151	87,778	e.	39	sw.	94	165	107	5.5	0.0
Key West, Fla.	22	30.07	30.09	+ .04	76.4	−1.1	90	81	52	72	28	68	76	25.72	−12.79	133	92,372	e.	46	n.	121	174	71	5.0	0.0
Tampa, Fla.	36	30.07	30.11	+ .03	71.4	−0.3	95	80	32	63	47	63	81	59.63	+ 7.30	123	54,539	ne.	48	se.	151	163	52	4.4	0.0
East Gulf States.																									
Atlanta, Ga.	1,131	28.98	30.12	+ .01	62.2	+0.9	97	71	10	53	59	50	71	34.12	−18.03	108	82,214	nw.	46	sw.	170	106	90	4.5	0.2
Pensacola, Fla.	56	30.04	30.10	+ .02	67.9	−0.1	99	75	22	61	49	59	77	62.14	+ 0.21	106	82,966	sw.	72	n.	148	112	106	4.9	0.0
Mobile, Ala.	57	30.04	30.10	+ .02	67.2	−0.1	99	75	22	59	49	58	79	60.39	− 2.41	117	64,840	n.	37	se.	118	114	134	5.6	T.
Montgomery, Ala.	221	29.87	30.10	+ .00	66.2	+0.5	101	76	19	56	55	55	74	45.82	− 7.10	96	54,068	sw.	41	nw.	173	110	83	4.4	T.
Vicksburg, Miss.	254	29.80	30.06	− .03	66.8	+0.9	100	76	22	57	59	54	70	37.98	−17.87	85	60,887	se.	38	w.	218	81	67	3.6	0.0
New Orleans, La.	54	30.04	30.10	+ .04	69.4	+0.2	96	77	28	62	49	60	78	49.68	−11.01	119	73,551	se.	54	n.	152	116	98	4.8	0.0
West Gulf States.																									
Shreveport, La.	249	29.80	30.06	− .01	67.0	+0.8	106	77	19	57	57	54	71	39.48	− 9.27	84	60,535	se.	45	w.	154	106	106	4.7	T.
Fort Smith, Ark.	481	29.53	30.04	.00	63.2	+2.4	107	74	14	52	61	50	68	25.70	−19.16	90	60,023	e.	42	n.	168	86	112	4.7	5.0
Little Rock, Ark.	302	29.76	30.06	+ .01	63.4	+1.2	105	73	15	54	59	51	70	33.32	−20.49	85	61,169	s.	38	n.	126	126	114	5.2	3.1
Corpus Christi, Tex.	20	30.08	30.05	.00	70.0	0.0	94	76	30	65	50	65	84	23.41	− 6.86	92	107,959	se.	42	n.	140	119	107	4.9	T.
Galveston, Tex.	42	30.04	30.08	+ .03	70.2	+0.2	94	75	32	66	44	62	79	23.71	−25.07	104	96,025	se.	44	*	174	106	86	4.2	T.
Palestine, Tex.	510	29.53	30.07	− .01	67.5	+1.9	104	78	20	57	57	54	71	38.40	− 8.23	83	60,607	s.	39	sw.	105	160	101	5.5	T.
San Antonio, Tex.	704	29.33	30.05	+ .01	69.9	+1.3	100	80	27	60	55	55	68	34.09	+ 4.32	90	75,145	se.	60	nw.	114	134	118	5.3	0.0
Ohio Valley & Tenn.																									
Chattanooga, Tenn.	762	29.32	30.13	+ .02	61.5	+0.9	98	71	8	52	62	49	70	37.77	−17.40	105	58,764	s.	46	w.	127	141	98	5.2	2.0
Knoxville, Tenn.	980	29.08	30.12	+ .02	59.6	+1.4	96	69	5	50	66	48	72	44.95	− 6.23	114	44,083	w.	36	w.	164	80	113	4.8	6.5
Memphis, Tenn.	399	29.66	30.09	+ .02	63.1	+1.5	101	72	14	54	57	52	72	35.00	−18.47	95	82,610	se.	44	se.	146	132	88	4.7	8.6
Nashville, Tenn.	545	29.52	30.11	+ .05	60.3	+0.9	99	70	9	51	65	48	69	40.21	−10.08	111	59,532	se.	43	sw.	160	105	101	4.7	4.8
Lexington, Ky.	989	29.08	30.09	+ .03	55.9	+0.9	95	65	− 2	47	70	44	70	43.20	− 0.83	125	101,615	sw.	56	sw.	63	122	181	6.8	28.1
Louisville, Ky.	525	29.52	30.09	+ .02	58.1	+1.0	98	68	3	49	70	45	67	48.32	+ 2.31	130	70,231	s.	45	w.	126	106	134	5.3	32.0
Indianapolis, Ind.	823	29.20	30.08	+ .02	54.1	+1.4	98	63	− 5	45	75	43	70	39.84	− 5.25	135	66,068	s.	44	*	102	143	121	5.6	46.8
Cincinnati, Ohio.	628	29.42	30.09	+ .02	55.6	+0.2	96	64	− 2	47	72	43	66	34.48	− 5.51	127	67,578	se.	50	nw.	140	134	102	5.1	29.3
Columbus, Ohio.	824	29.20	30.09	+ .03	53.0	+0.7	95	62	− 3	44	67	44	77	40.53	+ 1.52	147	61,143	sw.	40	w.	74	145	147	6.4	23.2
Pittsburg, Pa.	842	29.18	30.08	+ .03	53.3	+0.3	94	62	− 2	45	67	46	79	44.35	+ 7.57	160	55,468	w.	36	nw.	91	145	130	5.9	28.3
Parkersburg, W. Va.	638	29.42	30.12	+ .03	54.6	+0.7	97	64	0	45	67	45	76	45.93	+ 3.86	151	47,509	se.	40	w.	83	112	171	6.4	32.8
Lower Lake Region.																									
Buffalo, N. Y.	768	29.22	30.05	+ .03	47.1	+0.7	86	54	− 9	40	66	38	73	37.29	− 0.84	152	124,628	w.	72	w.	61	137	168	6.8	72.0
Oswego, N. Y.	335	29.66	30.08	+ .01	45.9	−0.6	90	53	−20	39	65	38	75	38.32	+ 2.21	166	97,804	se.	42	*	90	98	183	6.3	74.9
Rochester, N. Y.	523	29.48	30.05	+ .03	47.7	+0.4	92	56	−10	40	64	38	72	36.84	+ 1.26	173	71,387	sw.	41	sw.	122	121	123	5.6	113.8
Erie, Pa.	714	29.29	30.06	+ .04	49.1	+0.2	92	56	− 7	42	70	41	75	37.02	− 4.37	154	96,353	sw.	47	w.	76	157	133	6.1	71.8
Cleveland, Ohio.	730	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sandusky, Ohio.	629	29.37	30.05	.00	50.8	+0.4	95	58	− 4	44	67	42	75	31.76	− 3.25	125	77,252	w.	42	nw.	82	94	190	6.5	25.4
Toledo, Ohio.	674	29.33	30.06	+ .03	50.9	+0.4	95	58	− 6	42	69	42	78	33.10	+ 2.10	133	87,411	sw.	44	*	110	116	140	5.8	63.2
Detroit, Mich.	730	29.26	30.05	+ .02	48.6	+0.3	95	56	− 6	41	67	40	76	36.20	+ 3.79	140	89,293	sw.	52	sw.	123	126	117	5.4	54.3
Upper Lake Region.																									
Alpena, Mich.	609	29.35	30.03	+ .02	43.0	+1.7	93	50	−11	36	65	36	79	30.14	− 5.02	154	83,023	nw.	43	sw.	103	132	131	5.9	53.7
Grand Haven, Mich.	628	29.34	30.02	+ .01	47.3	+1.0	87	55	− 6	40	64	40	80	30.18	− 4.66	157	90,731	sw.	52	nw.	99	113	154	6.1	58.8
Marquette, Mich.	734	29.18	29.99	− .01	42.0	+1.4	96	50	−13	34	63	34	78	29.59	− 2.54	182	89,591	nw.	52	*	62	122	182	6.8	105.8
Port Huron, Mich.	639	29.36	30.06	+ .04	46.8	+1.7	91	54	− 9	39	65	39	78	28.43	− 3.26	148	98,560	s.	54	sw.	132	124	110	5.1	29.2
Sault Ste. Marie, Mich.	634	29.32	30.01	+ .01	39.5	−0.5	89	48	−25	31	60	33	82	34.62	+ 5.05	159	75,826	se.	52	nw.	98	116	152	6.1	110.7
Chicago, Ill.	594	29.16	30.05	+ .02	49.8	+1.1	98	57	− 9	43	67	40	72	33.14	− 1.70	114	149,234	s.	62	s.	136	136	94	5.0	56.6
Milwaukee, Wis.	671	29.31	30.04	+ .01	47.2	+2.0	98	55	−12	40	71	40	80	28.98	− 3.15	129	89,378	sw.	52	w.	104	108	154	6.0	51.4
Greenbay, Wis.	617	29.36	30.04	+ .04	45.0	+1.4	95	53	−15	36	73	36	73	33.09	+ 0.72	127	73,522	s.	45	sw.	79	150	137	6.3	32.5
Duluth, Minn.	702	29.23	30.01	+ .01	39.6	+0.4	90	47	−25	32	74	32	78	27.19	− 3.86	146	87,759	ne.	55	ne.	104	151	111	5.5	50.4
North Dakota.																									
Moorhead, Minn.	905	28.97	30.01	− .01	37.7	+0.1	95	48	−28	38	78	30	76	26.80	+ 3.00	133	93,010	n.	63	se.	110	115	141	5.8	43.0
Bismarck, N. Dak.	1,674	28.22	30.04	+ .03	38.9	−1.0	103	50	−23	28	83	26	65	16.64	− 1.77	108	83,829	nw.	54	nw.	144	125	97	5.1	37.0
Williston, N. Dak.	1,875	27.98	30.01	+ .01	37.6	−1.7	94	49	−26	26	74	28	73	22.04	+ 7.33	104	78,548	n.	60	nw.	116	156	94	5.0	94.7
Upper Mississippi Valley.																									
Minneapolis, Minn.	.....	.....	.....	.....	45.0	+0.8	99	54	−18	36	77	.....	.....	30.65	+ 3.44	121	95,353	nw.	66	n.	88	155	123	.....	27.0
St. Paul, Minn.	837	29.10	30.02	+ .01	44.0	+0.4	100	53	−18	35	75	34	73	34.73	+ 7.22	126	66,907	se.	60	nw.	86	160	120	5.8	41.5
La Crosse, Wis.	.....	.....	.....	.....	46.1	+0.2	99	56	−16	36	73	.....	.....	29.15	− 1.57	114	61,530	s.	40	w.	115	140	111	5.5	37.9
Davenport, Iowa.	599	29.38	30.03	− .01	50.8	+1.5	96	59	− 8	42	70	40	72	28.68	− 5.10	115	80,408	e.	60	nw.	97	128	141	5.9	32.8
Des Moines, Iowa.	867	29.12	30.06	+ .03	50.1	+1.1	95	60	− 8	41	76	39	70	37.09	+ 3.93	116	70,832	nw.	40	se.	123	115	128	5.4	26.5
Dubuque, Iowa.	650	.....	.....	.....	49.6	+1.8	99	59	−10	42	74	.....	.....	42.29	+ 6.70	127	.....	s.	.....	.....	99	143	124	.....	33.7
Keokuk, Iowa.	614	29.38	30.04	+ .01	53.0	+0.9	98	62	− 8	44	75	42	72	36.97	+ 1.98	115	68,981	sw.	48	nw.	139	120	107	4.8	33.8
Cairo, Ill.	359	29.68	30.07	+ .01	59.4	+1.5	98	67	− 8	51	61	49	73	39.36	− 3.61	111	73,042	s.	60	nw.	99	152	115	5.4	13.9
Springfield, Ill.	644	29.37	30.07	+ .01	53.7	+0.9	98	62	− 4	45	70	43	72	35.73	− 2.39	109	84,262	s.	44	s.	103	134	129	5.7	16.3

TABLE I.—*Annual meteorological summary, Weather Bureau stations,* 1896.—Continued.

Districts and stations.	Elevation of barometer above sea level.	Pressure in inches.†			Temperature of the air, in degrees Fahrenheit.							Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation.			Wind.				Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall, in inches.‡
		Mean actual, 8 a. m.+8 p. m.÷2.	Mean reduced.	Departure from normal.	Mean max. + min.÷2.	Departure from normal.	Maximum.	Mean maximum.	Minimum.	Mean minimum.	Greatest monthly range.			Total, in inches.	Departure from normal.	Days with .01, or more.	Total movement, miles.	Prevailing direction.	Max. velocity. Miles per hour.	Max. velocity. Direction.					
U. Mis. Valley—Cont'd.																									
Hannibal, Mo	534	29.47	30.05	.....	54.2	.....	100	63	1	45	70	44	72	35.23	+ 2.45	113	81,139	sw.	49	sw.	146	114	106	4.8	21.4
St. Louis, Mo	567	29.47	30.08	+ .02	57.9	+1.8	100	66	5	50	70	47	72	37.55	− 3.64	120	94,751	s.	80	nw.	150	113	103	5.0	17.2
Missouri Valley.																									
Columbia, Mo	.....	.....	.....	.....	56.3	+1.8	104	67	2	45	71	.....	.....	31.18	− 8.85	112	76,584	se.	42	nw.	107	99	160	6.0	27.7
Kansas City, Mo	963	29.03	30.06	+ .02	55.4	+1.5	103	65	0	46	71	45	73	33.64	− 2.77	100	75,661	se.	40	sw.	198	129	109	5.0	29.3
Springfield, Mo	1,324	28.65	30.05	.00	56.8	+0.8	100	66	4	48	65	46	72	40.89	− 4.96	105	91,234	se.	60	nw.	105	175	86	4.9	25.7
Topeka, Kans	.....	.....	.....	.....	56.1	+2.7	105	67	1	45	72	.....	.....	36.56	+ 1.81	101	.....	s.	.....	.....	115	130	121	.....	11.4
Omaha, Nebr	1,103	28.85	30.03	− .03	51.2	+1.4	96	60	− 8	42	76	40	69	35.90	+ 4.18	109	68,924	se.	54	ne.	117	115	134	5.5	20.2
Sioux City, Iowa	1,165	.....	.....	.....	47.2	+0.1	98	58	−10	36	79	.....	.....	30.77	+ 6.24	89	94,654	nw.	56	sw.	125	111	130	5.5	15.1
Pierre, S. Dak	1,460	28.42	29.99	− .04	45.9	+1.0	103	57	−16	35	86	33	67	17.35	+ 1.56	77	82,987	se.	52	sw.	111	138	117	5.4	27.8
Huron, S. Dak	1,310	28.60	30.03	− .01	42.8	+0.2	101	55	−17	31	90	32	70	26.10	+ 5.04	106	113,724	se.	56	*	96	162	108	5.5	20.1
Northern Slope.																									
Havre, Mont	2,477	27.33	29.98	− .03	39.7	−1.4	98	51	−33	28	96	28	71	16.48	+ 2.38	98	75,251	sw.	49	sw.	150	132	84	4.8	38.5
Miles City, Mont	2,372	27.45	29.97	− .05	43.4	−0.8	98	55	−25	32	96	30	65	11.72	− 1.00	91	61,747	nw.	46	w.	144	110	112	5.0	23.3
Helena, Mont	4,108	25.83	30.06	+ .03	43.6	+0.3	95	53	−22	34	85	27	57	15.38	+ 2.18	95	64,657	sw.	50	sw.	162	100	114	4.8	58.2
Rapid City, S. Dak	3,260	26.59	29.99	− .02	46.7	+0.6	100	58	−14	35	85	30	59	13.68	− 3.06	107	84,386	sw.	58	n.	90	160	116	5.8	40.3
Cheyenne, Wyo	6,105	24.00	30.00	− .03	45.7	+0.8	90	58	−12	34	80	26	53	20.79	+ 8.57	83	100,323	nw.	58	nw.	106	187	73	5.3	50.8
Lander, Wyo	5,372	24.64	30.05	+ .01	43.0	+0.4	95	57	−31	29	98	25	58	12.32	− 1.16	74	37,648	sw.	50	w.	123	174	69	4.9	81.3
North Platte, Nebr	2,826	27.08	30.03	− .01	49.8	+1.3	100	63	−14	37	91	37	68	16.52	− 1.77	70	85,663	se.	55	se.	126	201	39	4.5	30.8
Middle Slope.																									
Denver, Colo	5,290	24.73	30.01	.00	51.6	+1.9	96	65	− 9	38	84	27	48	11.84	− 2.67	75	71,468	s.	66	sw.	111	197	58	4.7	48.3
Pueblo, Colo	4,713	25.26	29.97	− .03	53.1	+1.1	102	68	−17	38	98	24	43	10.81	− 1.32	66	67,062	nw.	54	n.	149	150	67	4.6	18.8
Concordia, Kans	1,398	28.53	30.02	− .04	54.4	+2.4	103	65	− 3	44	77	42	70	33.34	+ 7.81	102	65,453	s.	44	s.	158	122	86	4.5	15.7
Dodge City, Kans	2,504	27.29	29.99	− .01	56.4	+2.8	104	70	2	43	76	39	64	19.57	0.00	69	102,393	se.	59	s.	196	115	55	4.0	5.3
Wichita, Kans	1,351	28.59	30.02	.00	58.0	+2.4	106	69	4	47	68	44	68	27.06	− 1.76	87	80,446	s.	44	s.	165	106	95	4.5	10.7
Oklahoma, Okla	1,218	28.74	30.03	.00	61.0	+1.6	104	72	11	50	66	48	70	21.90	−11.46	78	85,023	s.	48	*	232	79	55	3.6	5.7
Southern Slope.																									
Abilene, Tex	1,749	28.22	30.03	− .01	65.6	+1.9	105	76	16	55	68	47	61	20.74	− 4.33	68	90,742	s.	60	sw.	149	133	84	4.6	4.0
Amarillo, Tex	3,691	26.27	30.01	− .02	57.2	+1.7	99	70	8	45	74	36	57	24.28	+ 6.08	79	144,633	s.	66	*	143	119	104	4.9	12.8
Southern Plateau.																									
El Paso, Tex	3,767	26.20	29.98	− .01	64.3	+0.3	103	78	14	51	63	31	40	9.79	+ 0.45	48	97,380	nw.	64	sw.	174	147	45	3.6	0.4
Santa Fe, N. Mex	6,998	23.30	30.01	− .01	50.1	+0.8	89	61	7	40	57	21	43	14.28	0.00	85	61,376	se.	50	sw.	180	128	58	4.1	45.4
Phœnix, Ariz	1,076	28.77	29.89	.....	70.2	+1.3	115	84	28	56	65	42	44	10.48	+ 3.25	40	40,542	w.	48	se.	229	85	52	3.0	0.0
Yuma, Ariz	139	29.75	29.89	− .03	73.1	+0.7	117	87	31	59	63	43	42	2.55	− 0.43	20	59,537	n.	40	sw.	274	74	18	2.0	0.0
Middle Plateau.																									
Carson City, Nev	4,720	25.30	30.05	.....	50.3	+0.7	97	64	7	36	64	29	50	14.44	+ 2.42	70	.....	sw.	.....	.....	189	112	65	3.9	24.6
Winnemucca, Nev	4,340	25.67	30.04	+ .02	49.5	+0.9	98	62	− 4	37	72	23	43	11.08	+ 2.37	97	87,531	sw.	58	w.	140	123	103	4.7	41.0
Salt Lake City, Utah	4,344	25.65	30.05	.00	51.5	−0.1	97	62	− 2	41	67	34	56	18.42	+ 2.18	105	52,324	se.	48	*	97	123	146	6.2	40.1
Northern Plateau.																									
Baker City, Oreg	3,470	26.44	30.04	− .01	46.4	+1.6	96	57	− 8	36	70	32	64	13.37	− 1.85	124	50,798	s.	44	nw.	107	116	143	5.6	33.2
Idaho Falls, Idaho	4,742	25.25	30.07	+ .02	44.4	+2.7	95	57	−26	32	86	30	67	17.18	+ 2.30	107	70,712	s.	43	s.	137	84	145	5.4	54.7
Spokane, Wash	1,943	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Walla Walla, Wash	1,018	28.93	30.02	− .02	53.5	−0.3	106	63	− 9	44	80	41	68	19.41	+ 2.59	132	54,409	s.	38	sw.	137	158	71	4.8	19.0
North Pacific Coast.																									
Fort Canby, Wash	179	29.82	30.02	.00	50.2	−0.6	89	55	20	45	43	46	88	78.57	+16.08	187	118,706	n.	32	se.	74	79	213	6.8	5.3
Port Angeles, Wash	29	.....	.....	.....	46.1	−0.4	83	54	12	41	43	.....	.....	30.40	+ 0.05	144	51,509	w.	38	*	124*	119*	118*	5.3	18.0
Seattle, Wash	119	29.88	30.01	.....	51.1	.....	93	58	15	44	48	43	76	42.83	.....	165	48,791	s.	34	sw.	98	100	168	6.0	10.4
Tatoosh Island, Wash	86	29.90	30.00	− .01	48.0	−0.9	72	52	24	44	31	43	83	100.85	+ 7.97	204	112,520	e.	68	w.	72	57	237	7.8	7.9
Astoria, Oreg	.....	.....	.....	.....	51.6	−0.3	86	58	19	46	41	.....	.....	94.82	+30.16	195	.....	w.	.....	.....	108	67	191	.....	6.0
Portland, Oreg	153	29.86	30.02	− .04	52.6	−0.5	93	60	11	45	49	42	74	44.13	− 2.91	164	74,919	nw.	49	se.	109	150	107	5.3	9.1
Roseburg, Oreg	521	29.45	30.02	− .06	53.2	0.0	99	63	14	44	61	42	74	43.69	+ 8.38	148	32,301	nw.	36	sw.	125	94	147	5.4	16.7
Middle Pacific Coast.																									
Eureka, Cal	64	30.01	30.07	+ .01	52.3	+0.9	72	59	27	46	42	47	86	59.54	+13.58	146	57,382	nw.	48	nw.	67	195	104	5.8	2.9
Redbluff, Cal	334	29.64	29.99	− .01	62.5	+0.1	109	73	26	52	55	42	56	28.16	+ 1.93	82	58,833	se.	42	se.	192	88	91	3.9	4.0
Sacramento, Cal	71	.....	.....	.....	60.7	+0.4	104	71	28	50	57	.....	.....	25.06	+ 4.08	68	77,401	sw.	48	s.	184	102	80	4.1	0.0
San Francisco, Cal	153	29.88	30.04	+ .01	55.9	−0.7	91	62	33	50	46	48	81	28.25	+ 4.43	84	93,251	w.	47	s.	165	111	90	4.5	0.5
Point Reyes Light, Cal	.....	.....	.....	.....	52.6	+0.2	85	57	34	48	42	.....	.....	30.42	− 0.14	87	149,806	nw.	77	nw.	133	81	152	.....	4.0
South Pacific Coast.																									
Fresno, Cal	332	29.63	29.98	− .01	63.7	+0.2	111	77	28	51	61	44	57	11.02	+ 1.97	47	49,879	nw.	38	se.	235	69	62	3.1	0.0
Los Angeles, Cal	330	29.64	29.99	.00	63.1	+0.6	108	74	35	52	59	49	71	11.80	− 5.61	36	33,333	w.	24	w.	142	187	37	3.6	0.0
San Diego, Cal	69	29.93	30.01	.00	61.9	+0.7	98	69	39	55	50	52	74	8.73	− 1.86	35	43,155	nw.	35	sw.	243	62	61	3.2	0.0
San Luis Obispo, Cal	201	29.82	30.04	.. ..	59.3	.....	99	71	32	47	61	46	70	21.45	.....	49	44,422	w.	30	s.	185	118	63	4.0	0.0

* More than one direction. † Not reduced to standard gravity. ‡ For the snow year, July 1, 1895, to June 30, 1896.

TABLE II.—*Annual meteorological summary, Canadian stations*, 1896.

Stations.	Pressure.			Temperature.		Precipitation.		Prevailing direction of wind.	Total depth of snowfall.*	Stations.	Pressure.			Temperature.		Precipitation.		Prevailing direction of wind.	Total depth of snowfall.*
	Mean not reduced.	Mean reduced.	Departure from normal.	Mean.	Departure from normal.	Total.	Departure from normal.				Mean not reduced.	Mean reduced.	Departure from normal.	Mean.	Departure from normal.	Total.	Departure from normal.		
	Ins.	*Ins.*	*Ins.*	°	°	*Ins.*	*Inches.*				*Ins.*	*Ins.*	*Ins.*	°	°	*Ins.*	*Inches.*		
St. Johns, N. F.	29.78	29.93	+.01	40.5	−0.9	62.63	.....	w.	113.4	Port Stanley	29.40	30.04	+.01	45.0	.....	36.68	+ 2.51	w.	84.2
Sydney, C. B. I.	29.90	29.96	+.03	41.9	+1.1	48.15	− 4.19	sw.	81.2	Saugeen, Ont	29.30	30.03	+.03	43.1	+1.9	28.88	− 5.50	w.	128.1
Halifax, N. S	29.89	30.02	+.06	43.2	+1.0	60.81	+14.37	w.	60.3	Parry Sound, Ont	29.31	30.02	+.02	40.4	+1.7	33.10	− 4.22	w.	136.0
Grand Manan, N. B.	29.98	30.03	+.05	42.0	.....	42.28	− 2.34	w.	49.5	Port Arthur, Ont	29.27	29.99	.00	34.8	+1.4	21.48	− 2.56	w.	38.2
Yarmouth, N. S.	29.92	30.00	+.02	43.0	−0.1	46.79	+ 0.66	nw.	66.4	Winnipeg, Man	29.13	29.99	−.02	32.6	+1.6	26.29	+ 2.84	n.	50.8
St. Andrews, N. B	.....	.....	.....	40.9	−0.4	34.75	− 5.27	nw.	74.7	Minnedosa, Man	28.14	29.99	.00	31.6	+2.1	23.70	+ 5.97	nw.	56.9
Charlottetown, P. E. I.	29.92	29.96	+.01	43.1	+2.4	38.42	− 3.36	w.	56.5	Qu'Appelle, Assin.	27.68	29.99	.00	31.5	−0.4	21.63	+ 6.69	nw.	54.3
Chatham, N. B.	29.95	29.97	+.02	36.6	+0.1	37.87	− 6.09	w.	127.4	Medicine Hat, Assin.	27.63	29.97	.00	38.8	−0.7	18.18	+ 7.41	s.	51.6
Father Point, Que.	29.94	29.97	+.03	34.0	−0.3	36.95	+ 7.15	w.	130.7	Swift Current, Assin.	27.37	30.00	.00	36.0	+0.7	14.11	− 1.74	w.	88.9
Quebec, Que	29.66	30.00	+.03	37.0	−0.5	40.90	− 1.88	ne.	82.7	Calgary, Alberta	26.35	29.96	−.02	34.6	−1.8	16.05	+ 2.77	w.	54.7
Montreal, Que	29.80	30.01	+.03	40.7	−0.1	41.23	+ 2.42	sw.	115.2	Prince Albert, Sask.	28.39	29.95	.....	30.5	.....	19.64	.....	nw.	59.7
Rockliffe, Ont.	29.49	30.01	−.03	36.5	+1.0	32.07	+ 1.02	nw.	101.9	Edmonton, Alberta	27.62	30.01	+.05	33.1	−2.5	15.24	+ 1.43	nw.	47.8
Kingston, Ont.	29.70	30.02	+.04	42.4	−0.1	25.78	− 8.16	sw.	.....	Battleford, Sask.	28.22	30.00	.....	31.1	.....	12.93	.....	se.	32.6
Toronto, Ont.	29.65	30.04	+.02	44.4	+1.0	29.08	− 1.67	nw.	70.9	Hamilton, Bermuda	29.97	30.13	+.04	69.6	.....	15.86	.....	sw.	0
White River, Ont.	28.63	30.02	.00	31.2	+0.2	26.42	+ 3.09	w.	110.4	Esquimalt, B. C.	29.96	29.99	.....	32.9	.....	46.47	.....	sw.	31.7

* For the snow year, July 1, 1895, to June 30, 1896.

TABLE III.—*Accumulated departures of average monthly temperatures during* 1896.

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual average.
New England	− 2.0	− 2.3	− 4.9	− 3.7	− 1.1	− 1.2	− 0.6	+ 0.5	− 0.1	− 1.7	+ 1.7	− 1.1	− 0.09
Middle Atlantic States	− 1.6	− 2.8	− 5.8	− 2.0	+ 3.1	+ 2.3	+ 2.6	+ 4.8	+ 4.7	+ 1.7	+ 5.9	+ 3.7	+ 0.31
South Atlantic States	− 2.5	− 4.3	− 5.6	− 2.2	+ 2.4	+ 2.5	+ 2.5	+ 4.6	+ 5.9	+ 4.2	+ 8.7	+ 5.6	+ 0.47
Florida Peninsula	− 3.5	− 7.1	− 8.8	− 2.7	− 2.3	− 2.7	−11.7	−11.4	−11.1	−11.6	− 7.8	− 2.2	− 0.77
East Gulf States	− 1.6	− 4.8	− 6.9	− 4.8	− 0.8	− 1.2	− 0.9	+ 1.7	+ 2.9	+ 2.2	+ 5.6	+ 4.3	+ 0.36
West Gulf States	+ 2.5	+ 2.6	+ 0.6	+ 2.8	+ 6.5	+ 7.8	+ 8.6	+11.3	+13.0	+11.6	+13.0	+14.5	+ 1.21
Ohio Valley and Tennessee	+ 2.3	+ 0.7	− 4.1	+ 2.8	+ 9.6	+ 9.5	+ 9.0	+11.2	+11.0	+ 8.5	+11.2	+12.3	+ 1.02
Lower Lake Region	+ 0.5	− 0.3	− 4.7	+ 2.0	+ 9.1	+ 9.9	+ 9.5	+11.3	+ 9.5	+ 6.0	+ 8.3	+ 7.5	+ 0.62
Upper Lake Region	+ 4.2	+ 6.6	+ 4.5	+ 9.8	+ 8.0	+20.5	+23.1	+20.7	+18.4	+16.5	+18.6	+17.5	+ 1.55
North Dakota	+ 4.7	+12.1	+ 6.0	+ 6.0	+ 8.7	+ 9.7	+ 8.1	+ 7.4	+ 5.0	+ 3.1	−16.5	−11.5	− 0.96
Upper Mississippi Valley	+ 6.4	+ 9.9	+ 6.9	+12.7	+20.1	+20.9	+19.9	+21.9	+19.0	+17.0	+12.4	+16.9	+ 1.41
Missouri Valley	+ 7.4	+14.3	+10.0	+14.6	+20.6	+20.3	+19.3	+21.4	+18.9	+16.5	+ 8.0	+14.1	+ 1.18
Northern Slope	+ 7.0	+16.6	+11.1	+ 8.9	+ 8.2	+10.0	+ 9.8	+ 9.4	+ 6.2	+ 6.4	− 6.8	+ 2.4	+ 0.20
Middle Slope	+ 9.8	+14.6	+11.3	+16.5	+20.9	+22.2	+21.9	+25.0	+24.2	+22.8	+18.6	+24.8	+ 2.07
Abilene (Southern Slope)	+ 4.9	+ 7.0	+ 5.6	+10.0	+17.0	+22.0	+21.4	+24.7	+25.6	+22.8	+21.5	+26.3	+ 2.19
Southern Plateau	+ 4.6	+ 5.0	+ 6.0	+ 3.8	+ 4.4	+ 7.7	+ 5.6	+ 5.5	+ 6.5	+ 7.1	+ 8.7	+10.6	+ 0.88
Middle Plateau	+ 6.1	+12.1	+10.9	+ 4.9	− 0.9	+ 2.1	+ 3.0	+ 1.8	+ 0.8	+ 3.2	+ 1.6	+ 5.0	+ 0.42
Northern Plateau	+ 9.4	+21.0	+21.0	+17.4	+10.8	+12.6	+15.9	+15.9	+15.3	+16.7	+10.8	+15.0	+ 1.25
North Pacific	+ 3.1	+ 7.0	+ 4.7	+ 0.9	− 2.9	− 3.7	+ 1.4	+ 2.6	+ 1.9	+ 2.2	− 4.0	− 1.8	− 0.15
Middle Pacific	+ 3.4	+ 6.7	+ 6.7	+ 2.2	− 0.9	− 0.8	+ 1.4	+ 1.6	+ 0.6	+ 1.2	− 1.0	+ 0.6	+ 0.05
Southern Pacific	+ 4.1	+ 7.8	+ 9.0	+ 4.5	+ 3.1	+ 4.8	+ 6.0	+ 5.0	+ 2.9	+ 3.8	+ 3.2	+ 6.0	+ 0.50

TABLE IV.—*Accumulated departures of total monthly precipitation during* 1896.

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual total.
New England	− 2.40	− 2.00	− 0.80	− 2.80	− 3.50	− 3.60	− 3.40	− 5.00	− 2.70	− 2.50	− 3.60	− 5.00	− 5.00
Middle Atlantic States	− 1.90	+ 0.20	+ 0.40	− 1.80	− 1.70	− 1.00	− 0.10	− 2.80	− 3.10	− 4.60	− 5.10	− 7.20	− 7.20
South Atlantic States	− 1.10	+ 0.40	− 1.70	− 3.70	− 4.80	− 5.20	− 4.00	− 7.30	− 9.80	−11.40	−11.00	−10.70	−10.70
Florida Peninsula	+ 0.20	+ 0.40	+ 0.40	− 0.60	− 2.70	− 0.10	+ 1.50	− 0.20	− 2.00	− 4.60	− 3.90	− 4.00	− 4.00
East Gulf States	− 1.70	− 1.40	− 2.30	− 4.00	− 6.00	− 4.50	− 5.00	− 7.00	− 8.30	− 6.70	− 7.00	− 9.00	− 9.00
West Gulf States	+ 0.50	+ 0.10	− 0.80	− 2.50	− 3.90	− 6.20	− 7.40	− 9.70	− 9.70	− 8.10	−10.30	−12.50	−12.50
Ohio Valley and Tennessee	− 2.60	− 3.80	− 3.90	− 5.60	− 6.00	− 6.70	− 2.80	− 3.50	− 2.30	− 3.30	− 2.50	− 4.60	− 4.60
Lower Lake Region	− 0.80	0.00	+ 0.80	+ 1.00	− 0.40	− 0.50	+ 2.10	+ 2.50	+ 3.60	+ 1.90	− 1.10	− 2.10	− 2.10
Upper Lake Region	− 0.50	− 1.10	− 1.80	− 0.70	− 0.90	− 2.40	− 2.60	− 2.20	− 1.30	− 2.10	− 1.10	− 2.40	− 2.40
North Dakota	+ 0.60	+ 0.50	+ 1.10	+ 2.30	+ 3.90	+ 3.00	− 1.40	+ 1.10	+ 1.50	+ 1.20	+ 3.30	+ 2.90	+ 2.90
Upper Mississippi Valley	− 0.80	− 1.60	− 2.20	− 1.30	+ 0.40	− 0.70	+ 1.00	+ 0.80	+ 1.70	+ 1.40	+ 1.70	+ 0.40	+ 0.40
Missouri Valley	− 0.50	− 1.20	− 1.70	− 0.50	+ 1.50	+ 0.20	+ 0.70	− 0.20	+ 0.20	+ 0.70	+ 1.00	+ 0.20	+ 0.20
Northern Slope	− 0.10	− 0.30	+ 0.40	+ 0.50	+ 0.40	− 0.40	+ 0.20	− 0.10	+ 0.70	+ 0.60	+ 1.30	+ 0.90	+ 0.90
Middle Slope	− 0.50	− 1.10	− 1.70	− 1.50	− 2.10	− 2.60	− 1.30	− 2.50	− 2.10	− 1.60	− 1.40	− 1.80	− 1.80
Abilene (Southern Slope)	+ 0.50	+ 0.10	− 1.30	− 2.90	− 5.80	− 6.90	− 4.50	− 6.20	− 5.20	− 3.40	− 3.90	+ 2.30	+ 2.30
Southern Plateau	+ 0.20	− 0.30	− 0.40	− 0.40	− 0.80	− 0.80	+ 0.50	+ 0.30	+ 0.60	+ 1.50	+ 1.30	+ 1.10	+ 1.10
Middle Plateau	+ 1.00	− 0.10	+ 0.30	+ 0.90	+ 2.30	+ 1.70	+ 2.20	+ 3.10	+ 3.10	+ 2.70	+ 3.50	+ 2.40	+ 2.40
Northern Plateau	− 0.20	− 1.40	− 1.40	− 1.10	− 0.30	− 0.80	− 0.70	+ 0.10	− 0.50	− 1.00	− 1.10	− 1.10	− 1.10
North Pacific	+ 3.50	+ 4.90	+ 3.20	+ 4.40	+ 5.70	+ 5.30	+ 4.20	+ 4.60	+ 2.60	+ 1.70	+ 7.00	+10.10	+10.10
Middle Pacific	+ 2.50	− 0.70	− 1.00	+ 2.40	+ 3.10	+ 2.70	+ 2.60	+ 2.80	+ 2.80	+ 2.40	+ 4.20	+ 3.90	+ 3.90
Southern Pacific	+ 0.40	− 2.00	− 1.50	− 1.60	− 1.80	− 1.90	− 1.90	− 1.90	− 2.00	− 1.30	− 1.00	− 1.80	− 1.80

TABLE V.—*Resultant winds from observations at 8 a. m. and 8 p. m., daily, during the year, 1896.*

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
New England.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
Eastport, Me	264	211	75	317	n. 78 w.	249
Portland, Me	286	352	47	118	s. 43 w.	104
Northfield, Vt	290	191	135	341	n. 80 w.	210
Nantucket, Mass	262	218	163	264	n. 64 w.	113
Woods Hole, Mass.*	87	147	77	139	s. 46 w.	86
Block Island, R. I	237	181	195	339	n. 68 w.	154
New Haven, Conn	301	206	103	261	n. 59 w.	184
Middle Atlantic States.						
Albany, N. Y	238	284	71	230	s. 75 w.	175
Binghamton, N. Y†						
New York, N. Y	245	204	155	311	n. 76 w.	161
Harrisburg, Pa	166	142	212	296	n. 74 w.	88
Philadelphia, Pa	284	193	130	290	n. 60 w.	184
Atlantic City, N. J						
Baltimore, Md	238	219	168	268	n. 80 w.	102
Washington, D. C	279	237	136	219	n. 58 w.	98
Lynchburg, Va	218	219	198	267	s. 69 w.	1
Norfolk, Va	250	244	220	300	n. 86 w.	80
South Atlantic States.						
Charlotte, N. C	171	304	284	130	s. 49 e.	204
Hatteras, N. C	283	209	171	249	n. 47 w.	108
Kittyhawk, N. C	251	222	213	243	n. 46 w.	42
Raleigh, N. C	258	250	138	236	n. 85 w.	98
Wilmington, N. C	211	245	182	274	s. 70 w.	98
Charleston, S. C	199	271	216	225	s. 7 w.	72
Augusta, Ga	224	207	211	241	n. 60 w.	34
Savannah, Ga	215	280	175	195	s. 17 w.	68
Jacksonville, Fla	220	253	263	169	s. 70 e.	100
Florida Peninsula.						
Jupiter, Fla	184	223	309	165	s. 75 e.	150
Key West, Fla	222	137	468	51	n. 79 e.	426
Tampa, Fla	308	112	286	186	n. 18 e.	313
Eastern Gulf States.						
Atlanta, Ga	215	185	231	288	n. 62 w.	64
Pensacola, Fla	271	232	213	198	n. 21 e.	42
Mobile, Ala	290	263	148	165	n. 33 w.	32
Montgomery, Ala	205	214	270	219	s. 80 e.	52
Vicksburg, Miss	181	300	283	153	s. 47 e.	176
New Orleans, La	218	273	290	198	s. 70 e.	162
Western Gulf States.						
Shreveport, La	170	341	267	141	s. 36 e.	212
Fort Smith, Ark	175	146	375	121	n. 84 e.	256
Little Rock, Ark	204	294	190	180	s. 6 e.	90
Corpus Christi, Tex	168	393	337	95	s. 57 e.	288
Galveston, Tex	138	381	247	134	s. 25 e.	268
Palestine, Tex	199	355	214	121	s. 31 e.	182
San Antonio, Tex	222	288	306	67	s. 79 e.	242
Ohio Valley and Tennessee.						
Chattanooga, Tenn	221	244	180	245	s. 70 w.	69
Knoxville, Tenn	274	108	204	292	n. 27 w.	192
Memphis, Tenn	229	268	243	143	s. 68 e.	107
Nashville, Tenn	228	271	187	228	s. 44 w.	59
Lexington, Ky	158	322	167	252	s. 27 w.	185
Louisville, Ky	211	304	155	198	s. 25 w.	102
Indianapolis, Ind	223	277	177	232	s. 46 w.	77
Cincinnati, Ohio	203	258	238	207	s. 30 e.	63
Columbus, Ohio	191	265	199	235	s. 26 w.	82
Pittsburg, Pa	188	252	138	316	s. 70 w.	189
Parkersburg, W. Va	165	275	196	213	s. 9 w.	111
Lower Lake Region.						
Buffalo, N. Y	157	298	165	349	s. 69 w.	197
Oswego, N. Y	156	321	171	249	s. 25 w.	183
Rochester, N. Y	137	264	137	376	s. 61 w.	267
Erie, Pa	174	268	141	314	s. 61 w.	197
Cleveland, Ohio						
Sandusky, Ohio	186	190	203	304	s. 88 w.	101
Toledo, Ohio	162	202	188	332	s. 74 w.	150
Detroit, Mich	198	233	172	309	s. 75 w.	142
Upper Lake Region.						
Alpena, Mich	204	224	174	308	s. 82 w.	136
Grand Haven, Mich	230	222	212	248	n. 77 w.	37
Marquette, Mich	256	216	132	311	n. 77 w.	183
Port Huron, Mich	210	294	139	228	s. 46 w.	122
Sault Ste. Marie, Mich	190	230	261	236	s. 32 e.	47
Chicago, Ill	209	256	144	252	s. 67 w.	118

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
Upper Lake Region—Cont'd.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
Milwaukee, Wis	240	216	179	269	n. 75 w.	94
Greenbay, Wis	186	300	140	237	s. 40 w.	150
Duluth, Minn	334	148	171	308	n. 58 w.	223
North Dakota.						
Moorhead, Minn	337	236	83	193	n. 48 w.	148
Bismarck, N. Dak	334	143	221	199	n. 6 e.	192
Williston, N. Dak	289	189	188	215	n. 16 w.	104
Upper Mississippi Valley.						
St. Paul, Minn	199	264	202	290	s. 54 w.	109
La Crosse, Wis	121	199	50	112	s. 39 w.	100
Davenport, Iowa	201	205	218	277	s. 86 w.	59
Des Moines, Iowa	258	237	185	209	n. 49 w.	32
Dubuque, Iowa						
Keokuk, Iowa	233	257	175	223	s. 63 w.	54
Cairo, Ill	233	313	171	150	s. 14 e.	83
Springfield, Ill	205	298	148	225	s. 40 w.	121
Hannibal, Mo	204	289	172	243	s. 40 w.	111
St. Louis, Mo	212	310	172	187	s. 8 w.	99
Missouri Valley.						
Columbia, Mo.*	103	134	111	110	s. 2 e.	31
Kansas City, Mo	214	300	231	164	s. 38 e.	109
Springfield, Mo	194	328	234	140	s. 35 e.	164
Omaha, Nebr	283	223	186	308	n. 20 w.	64
Sioux City, Iowa	145	131	100	74	n. 62 e.	30
Pierre, S. Dak	256	173	284	182	n. 51 e.	132
Huron, S. Dak	272	231	232	201	n. 37 e.	51
Northern Slope.						
Havre, Mont	233	145	158	348	n. 65 w.	209
Miles City, Mont	281	175	184	219	n. 18 w.	112
Helena, Mont	152	261	45	438	s. 73 w.	411
Rapid City, S. Dak	220	218	142	307	n. 89 w.	165
Cheyenne, Wyo	275	184	65	357	n. 73 w.	306
Lander, Wyo	172	280	132	330	s. 62 w.	225
North Platte, Nebr	185	247	197	266	s. 48 w.	93
Middle Slope.						
Denver, Colo	213	316	147	300	s. 27 w.	117
Pueblo, Colo	279	164	204	257	n. 25 w.	126
Concordia, Kans	210	315	178	155	s. 12 e.	107
Dodge City, Kans	248	282	271	103	s. 79 e.	172
Wichita, Kans	238	337	198	81	s. 50 e.	153
Oklahoma, Okla	212	380	184	105	s. 25 e.	186
Southern Slope.						
Abilene, Tex	175	394	182	150	s. 8 e.	221
Amarillo, Tex	171	399	90	152	s. 15 w.	236
Southern Plateau.						
El Paso, Tex	232	110	243	328	n. 35 w.	149
Santa Fe, N. Mex	205	269	290	174	s. 61 e.	132
Phœnix, Ariz	52	329	132	332	s. 36 w.	342
Yuma, Ariz	272	167	188	247	n. 29 w.	120
Middle Plateau.						
Carson City, Nev	172	220	116	330	s. 77 w.	219
Winnemucca, Nev	177	232	196	269	s. 53 w.	92
Salt Lake City, Utah	188	245	262	228	s. 30 e.	66
Northern Plateau.						
Baker City, Oreg	208	355	128	169	s. 15 w.	158
Idaho Falls, Idaho	240	371	64	159	s. 36 w.	162
Spokane, Wash						
Walla Walla, Wash	90	440	113	190	s. 12 w.	357
North Pacific Coast Region.						
Fort Canby, Wash	228	223	178	213	n. 82 w.	35
Port Angeles, Wash	50	223	128	245	s. 34 w.	208
Seattle, Wash	217	325	183	147	s. 18 e.	114
Tatoosh Island, Wash	82	253	273	238	s. 12 e.	174
Portland, Oreg	261	249	149	269	n. 84 w.	120
Roseburg, Oreg	274	191	177	145	n. 21 e.	89
Middle Pacific Coast Region.						
Eureka, Cal	240	231	170	282	n. 85 w.	112
Redbluff, Cal	270	252	208	229	n. 49 w.	38
Sacramento, Cal	174	349	136	225	s. 27 w.	196
San Francisco, Cal	120	184	53	493	s. 82 w.	445
South Pacific Coast Region.						
Fresno, Cal	295	71	138	414	n. 51 w.	355
Los Angeles, Cal	218	82	197	356	n. 50 w.	309
San Diego, Cal	299	110	134	367	n. 50 w.	300
San Luis Obispo, Cal	319	156	70	282	n. 53 w.	267

*From observations at 8 p. m. only.

TABLE VI.—*Total number of thunderstorms reported during* 1896.

State.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Alabama	19	21	18	27	60	57	44	62	9	10	9	10	376
Arizona	6	2	0	0	5	45	60	55	6	32	2	0	213
Arkansas	7	6	29	53	77	66	83	72	34	19	18	1	465
California	30	4	23	26	53	15	90	94	33	8	1	4	381
Colorado	1	3	3	8	5	171	175	110	72	10	2	2	562
Connecticut	0	2	5	37	50	20	66	50	39	0	1	0	270
Delaware	0	4	2	5	25	19	31	11	12	2	0	0	111
Dist. of Columbia	1	1	0	1	8	6	9	3	4	0	0	0	33
Florida	33	25	35	94	106	160	126	188	111	12	16	1	837
Georgia	16	21	15	27	60	41	64	62	17	0	15	4	343
Idaho	4	4	11	20	28	91	80	42	14	0	0	4	298
Illinois	2	6	85	178	326	210	239	180	157	21	33	4	1,441
Indiana	0	0	38	39	132	94	82	82	55	5	2	0	529
Indian Territory	0	2	4	1	13	4	5	1	0	2	3	1	36
Iowa	0	1	71	218	219	184	201	185	71	43	11	0	1,204
Kansas	1	2	24	122	174	145	124	69	75	42	14	0	792
Kentucky	1	1	39	27	80	59	80	54	21	1	2	10	375
Louisiana	28	45	46	42	95	132	78	158	58	46	36	17	781
Maine	0	2	2	0	20	20	36	23	19	4	0	0	154
Maryland	2	13	17	35	124	94	75	62	66	4	4	0	496
Massachusetts	0	2	3	60	103	32	79	122	102	0	7	0	539
Michigan	0	0	25	129	176	137	97	229	44	31	11	0	879
Minnesota	0	0	38	204	124	150	102	133	59	20	9	0	839
Mississippi	15	30	35	61	78	113	63	110	12	23	24	5	564
Missouri	1	8	62	249	470	293	275	270	238	43	28	8	1,945
Montana	0	1	8	13	14	61	43	31	3	1	0	0	175
Nebraska	0	0	29	160	165	136	120	94	44	19	31	1	806
Nevada	2	0	12	0	28	20	100	68	10	7	0	0	247
New Hampshire	0	0	4	32	28	11	43	46	21	2	0	0	187
New Jersey	0	25	24	43	146	107	109	71	80	1	5	0	701
New Mexico	1	1	1	5	15	57	67	67	26	24	0	13	277
New York	0	3	23	86	96	102	137	134	65	5	9	0	650
North Carolina	8	35	43	98	245	219	241	221	127	13	21	1	1,297
North Dakota	0	0	2	33	67	54	32	39	11	2	0	1	241
Ohio	0	2	89	279	345	424	482	284	109	1	1	0	2,016
Oklahoma	0	1	5	6	41	34	13	4	11	8	7	0	130
Oregon	2	4	1	10	16	24	16	25	10	0	4	7	119
Pennsylvania	0	21	8	76	190	148	202	103	105	3	12	0	868
Rhode Island	0	1	1	9	7	2	9	14	14	0	0	0	57
South Carolina	10	30	27	34	109	105	91	110	46	5	20	5	592
South Dakota	0	0	7	44	28	75	45	50	28	1	2	0	280
Tennessee	12	5	69	112	121	100	132	76	33	5	37	14	716
Texas	44	16	46	31	59	72	84	57	65	49	22	23	568
Utah	5	1	4	0	26	37	71	43	28	8	1	2	226
Vermont	0	1	3	14	22	18	31	25	20	2	2	0	138
Virginia	3	9	27	24	139	118	98	69	54	2	0	0	543
Washington	0	1	1	9	25	34	11	13	6	1	0	0	101
West Virginia	0	0	16	29	104	102	76	49	43	2	0	0	421
Wisconsin	0	0	32	180	160	168	107	172	47	21	8	0	895
Wyoming	0	0	0	0	12	6	13	6	8	0	0	0	45

TABLE VII.—*Number of days on which thunderstorms were reported.*

Alabama	4	7	5	5	17	26	19	24	7	6	3	3	126
Arizona	2	2	0	0	3	13	26	22	5	11	2	0	86
Arkansas	5	4	7	19	25	19	24	20	12	9	6	1	151
California	8	3	6	9	13	11	25	18	10	6	1	2	112
Colorado	1	1	3	7	4	26	30	26	18	5	1	1	123
Connecticut	0	2	3	7	10	7	16	14	6	0	1	0	66
Delaware	0	2	1	3	12	10	17	8	5	1	0	0	59
Dist. of Columbia	1	1	0	1	8	6	9	3	4	0	0	0	33
Florida	5	8	6	6	22	29	28	31	26	9	8	1	179
Georgia	4	8	7	8	21	19	29	19	11	0	5	1	132
Idaho	2	3	5	11	17	25	18	16	5	0	0	4	106
Illinois	2	4	13	19	24	26	25	19	20	6	9	2	159
Indiana	0	0	6	11	21	21	19	17	13	2	1	0	111
Indian Territory	0	1	4	1	6	3	5	1	0	2	2	1	26
Iowa	0	1	7	23	23	25	23	22	16	7	3	0	150
Kansas	1	1	5	21	28	24	27	19	16	9	2	0	153
Kentucky	1	1	6	9	20	19	24	15	11	1	2	3	112
Louisiana	7	11	12	10	20	24	24	28	19	10	13	7	185
Maine	0	1	2	2	7	7	9	11	7	1	0	0	47
Maryland	1	3	5	9	19	18	20	18	14	1	3	0	111
Massachusetts	0	2	2	7	12	5	16	11	9	0	4	0	68
Michigan	0	0	4	22	22	19	18	24	16	7	3	0	135
Minnesota	0	0	6	20	25	19	19	21	13	5	3	0	131
Mississippi	5	9	13	11	16	24	25	25	5	10	10	2	155
Missouri	1	3	7	23	26	26	26	25	25	13	8	7	190
Montana	0	1	5	9	10	24	17	16	2	1	0	0	85
Nebraska	0	0	2	23	27	21	24	21	15	6	2	1	142
Nevada	2	0	5	0	5	10	23	17	7	7	0	0	76
New Hampshire	0	0	1	6	10	4	13	17	4	1	0	0	56
New Jersey	0	3	6	7	17	17	23	12	10	1	1	0	97
New Mexico	1	1	1	4	5	21	29	31	15	17	0	2	127
New York	0	1	4	9	20	19	22	22	12	3	4	0	116
North Carolina	4	7	10	15	27	25	31	23	21	6	4	1	174
North Dakota	0	0	1	7	20	19	17	14	5	1	0	1	85
Ohio	0	1	8	16	25	25	26	18	13	1	1	0	134
Oklahoma	0	1	3	5	13	12	7	4	9	2	2	0	58
Oregon	2	4	1	7	11	10	9	9	4	0	4	3	64
Pennsylvania	0	2	5	13	20	23	24	18	14	3	3	0	125
Rhode Island	0	1	1	4	5	2	6	6	6	0	0	0	31
South Carolina	3	6	8	8	26	20	28	20	16	4	4	1	144
South Dakota	0	0	3	17	14	26	20	16	9	1	1	0	107
Tennessee	5	2	9	18	22	22	27	22	10	4	7	1	149
Texas	11	8	14	13	19	20	27	19	21	15	10	4	181
Utah	2	1	3	0	9	14	23	16	10	7	1	2	88
Vermont	0	1	1	3	12	6	13	9	6	1	1	0	53
Virginia	1	3	3	6	21	24	26	17	12	1	0	0	116
Washington	0	1	1	4	11	8	8	8	3	1	0	0	45
West Virginia	0	0	5	8	19	26	25	17	14	1	0	0	115
Wisconsin	0	0	4	25	23	21	21	17	12	3	8	0	132
Wyoming	0	0	0	0	3	6	11	5	6	0	0	0	31

TABLE VIII.—*Total number of auroras reported during* 1896.

State.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Alabama	0	0	0	0	0	0	0	0	0	0	0	0	0
Arizona	0	0	0	0	0	0	0	0	0	0	0	0	0
Arkansas	0	0	0	0	0	0	0	0	0	0	0	0	0
California	0	0	0	0	0	0	0	0	0	0	0	0	0
Colorado	1	0	0	0	0	0	2	0	0	0	0	4	7
Connecticut	11	1	2	4	0	2	3	4	0	1	1	9	38
Delaware	0	0	2	0	0	3	1	1	2	2	2	3	16
Dist. of Columbia	0	0	0	0	0	0	0	0	0	0	0	1	1
Florida	0	0	0	0	0	0	0	0	0	0	0	0	0
Georgia	0	1	0	0	0	0	0	0	0	0	0	0	1
Idaho	0	0	11	1	0	0	4	2	0	1	3	5	27
Illinois	2	3	14	9	11	1	1	4	2	5	1	4	57
Indiana	1	1	0	1	3	0	1	1	0	1	0	3	12
Indian Territory	0	0	0	0	0	0	0	0	0	0	0	0	0
Iowa	6	1	19	6	14	1	6	12	0	1	2	4	72
Kansas	6	6	1	0	0	0	1	2	0	1	4	14	35
Kentucky	1	3	0	2	0	0	1	0	0	0	0	0	7
Louisiana	0	0	0	0	0	0	0	0	0	0	0	0	0
Maine	24	14	7	9	5	2	2	7	3	16	0	8	97
Maryland	1	2	10	3	1	0	0	4	0	0	3	14	38
Massachusetts	17	2	16	5	6	0	4	3	0	14	4	24	95
Michigan	5	3	43	30	8	2	1	14	3	6	1	12	130
Minnesota	19	12	45	30	22	4	8	32	15	4	1	2	194
Mississippi	0	0	0	0	0	1	0	0	0	0	0	0	1
Missouri	3	0	0	1	0	1	0	0	0	0	1	11	17
Montana	12	13	12	15	5	1	15	26	0	13	3	13	128
Nebraska	2	1	12	2	4	2	4	11	0	0	4	25	67
Nevada	5	3	0	0	1	0	2	0	0	0	0	1	12
New Hampshire	20	9	19	9	10	7	4	10	5	11	4	13	121
New Jersey	3	1	13	0	5	3	6	7	0	0	1	13	52
New Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0
New York	17	1	24	1	24	1	2	10	0	3	3	28	114
North Carolina	0	2	0	0	0	0	0	0	0	0	0	0	2
North Dakota	24	10	58	32	9	7	11	33	10	14	2	14	224
Ohio	4	0	35	11	26	1	5	4	0	0	8	25	123
Oklahoma	0	0	0	0	0	0	0	0	0	0	0	0	0
Oregon	0	0	0	0	1	0	0	0	0	0	0	0	1
Pennsylvania	4	1	8	0	7	1	3	1	0	5	1	7	38
Rhode Island	3	0	3	2	2	0	0	1	0	1	0	3	15
South Carolina	0	0	0	0	0	0	0	0	0	0	0	0	0
South Dakota	6	6	12	9	6	0	4	9	5	2	3	8	70
Tennessee	2	2	0	0	0	0	0	0	0	0	1	0	5
Texas	1	0	0	0	0	0	0	0	0	0	0	0	1
Utah	0	0	0	0	0	0	0	0	0	0	0	0	0
Vermont	6	7	7	0	2	0	1	6	2	3	0	12	46
Virginia	1	0	1	0	0	0	1	1	0	1	2	7	7
Washington	0	0	5	5	4	0	1	4	0	0	1	1	21
West Virginia	0	0	1	0	0	0	0	0	0	0	4	5	5
Wisconsin	15	9	33	33	45	5	10	28	2	3	6	2	191
Wyoming	0	0	1	1	1	0	1	2	0	0	0	0	6

TABLE IX.—*Total number of days on which auroras occurred.*

Alabama	0	0	0	0	0	0	0	0	0	0	0	0	0
Arizona	0	0	0	0	0	0	0	0	0	0	0	0	0
Arkansas	0	0	0	0	0	0	0	0	0	0	0	0	0
California	0	0	0	0	0	0	0	0	0	0	0	0	0
Colorado	1	0	0	0	0	0	1	0	0	0	0	1	3
Connecticut	3	1	2	4	0	2	1	3	0	1	1	2	20
Delaware	0	0	2	0	0	3	1	1	2	2	2	2	15
Dist. of Columbia	0	0	0	0	0	0	0	0	0	0	0	1	1
Florida	0	0	0	0	0	0	0	0	0	0	0	0	0
Georgia	0	1	0	0	0	0	0	0	0	0	0	0	1
Idaho	0	0	6	1	0	0	2	2	0	1	3	5	20
Illinois	1	3	6	6	3	1	1	2	2	5	1	3	34
Indiana	1	1	0	1	3	0	1	0	1	0	1	3	12
Indian Territory	0	0	0	0	0	0	0	0	0	0	0	0	0
Iowa	3	1	10	4	8	1	2	3	0	1	2	1	36
Kansas	5	6	1	0	0	0	1	2	0	1	3	2	21
Kentucky	1	3	0	2	0	0	1	0	0	0	0	0	7
Louisiana	0	0	0	0	0	0	0	0	0	0	0	0	0
Maine	3	5	2	4	4	2	2	5	3	5	0	4	44
Maryland	1	2	2	3	1	0	1	1	0	0	3	2	15
Massachusetts	4	1	5	3	2	0	1	3	0	7	4	3	33
Michigan	4	3	10	11	6	1	1	7	3	4	1	7	58
Minnesota	9	8	10	6	9	4	4	11	11	3	1	2	78
Mississippi	0	0	0	0	0	1	0	0	0	0	0	0	1
Missouri	3	0	0	1	0	1	0	0	0	0	1	3	9
Montana	10	6	7	9	2	1	6	11	0	6	3	2	70
Nebraska	2	1	8	1	1	2	2	3	0	0	4	6	30
Nevada	5	3	0	0	1	0	2	0	0	0	0	1	12
New Hampshire	8	7	7	8	7	7	3	5	2	5	4	5	68
New Jersey	2	1	5	0	2	3	4	1	0	0	1	1	20
New Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0
New York	8	1	5	1	5	1	1	6	0	0	2	8	40
North Carolina	0	2	0	0	0	0	0	0	0	0	0	0	2
North Dakota	11	7	16	13	7	5	6	14	6	5	1	5	96
Ohio	4	0	9	6	6	1	4	3	4	0	8	11	56
Oklahoma	0	0	0	0	0	0	0	0	0	0	0	0	0
Oregon	0	0	0	0	1	0	0	0	0	0	0	0	1
Pennsylvania	4	1	4	0	2	1	3	1	0	3	1	3	23
Rhode Island	1	0	1	2	2	0	0	1	0	1	1	1	9
South Carolina	1	0	0	0	2	0	0	0	0	2	0	0	6
South Dakota	5	6	7	3	2	0	3	6	4	2	3	3	44
Tennessee	2	2	0	0	0	0	0	0	0	0	1	0	5
Texas	1	0	0	0	0	0	0	0	0	0	0	0	1
Utah	0	0	0	0	0	0	0	0	0	0	0	0	0
Vermont	6	6	5	1	0	0	1	4	2	3	0	5	33
Virginia	1	0	1	0	0	0	1	1	1	0	1	1	6
Washington	0	0	5	4	0	0	1	2	0	0	0	1	18
West Virginia	0	0	1	0	0	0	0	0	0	0	1	2	3
Wisconsin	9	7	9	7	10	4	4	11	2	3	6	1	73
Wyoming	0	0	1	1	1	0	1	2	0	0	0	0	6

Chart IV. Sea-level Temperature and Pressure for 1896; by Park Morrill.

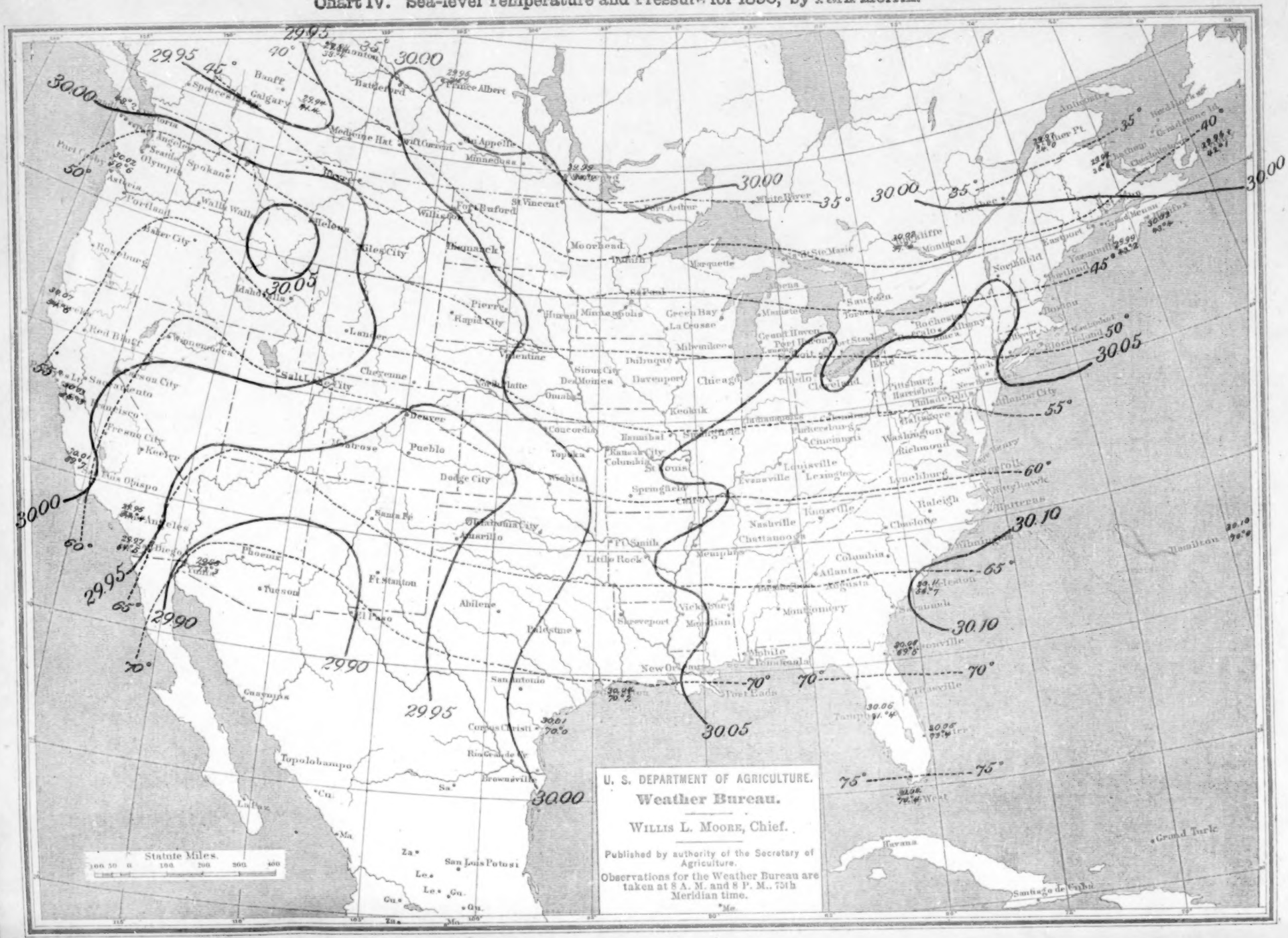

Chart III. Total Annual Precipitation, 1896.

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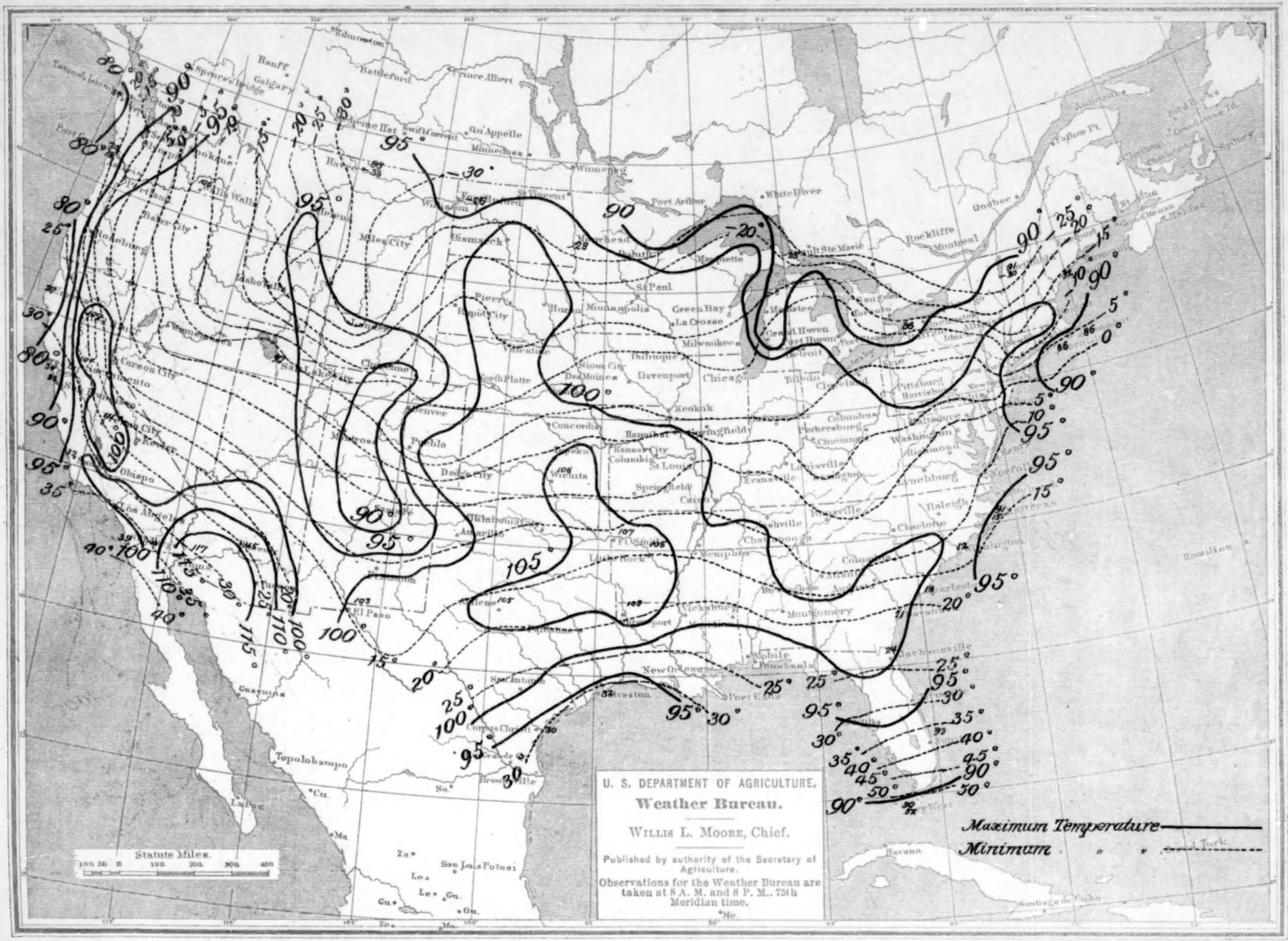
Observations for the Weather Bureau are taken at 8 A. M. and 8 P. M., 75th Meridian time.

Chart II. Annual Maximum and Minimum Temperatures, 1896.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Weather Bureau.
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Statute Miles.
Maximum Temperature
Minimum

Chart III. Total Annual Precipitation, 1896.

Chart I. Surface Temperature, Resultant Wind, and Reduced Barometer for 1896.

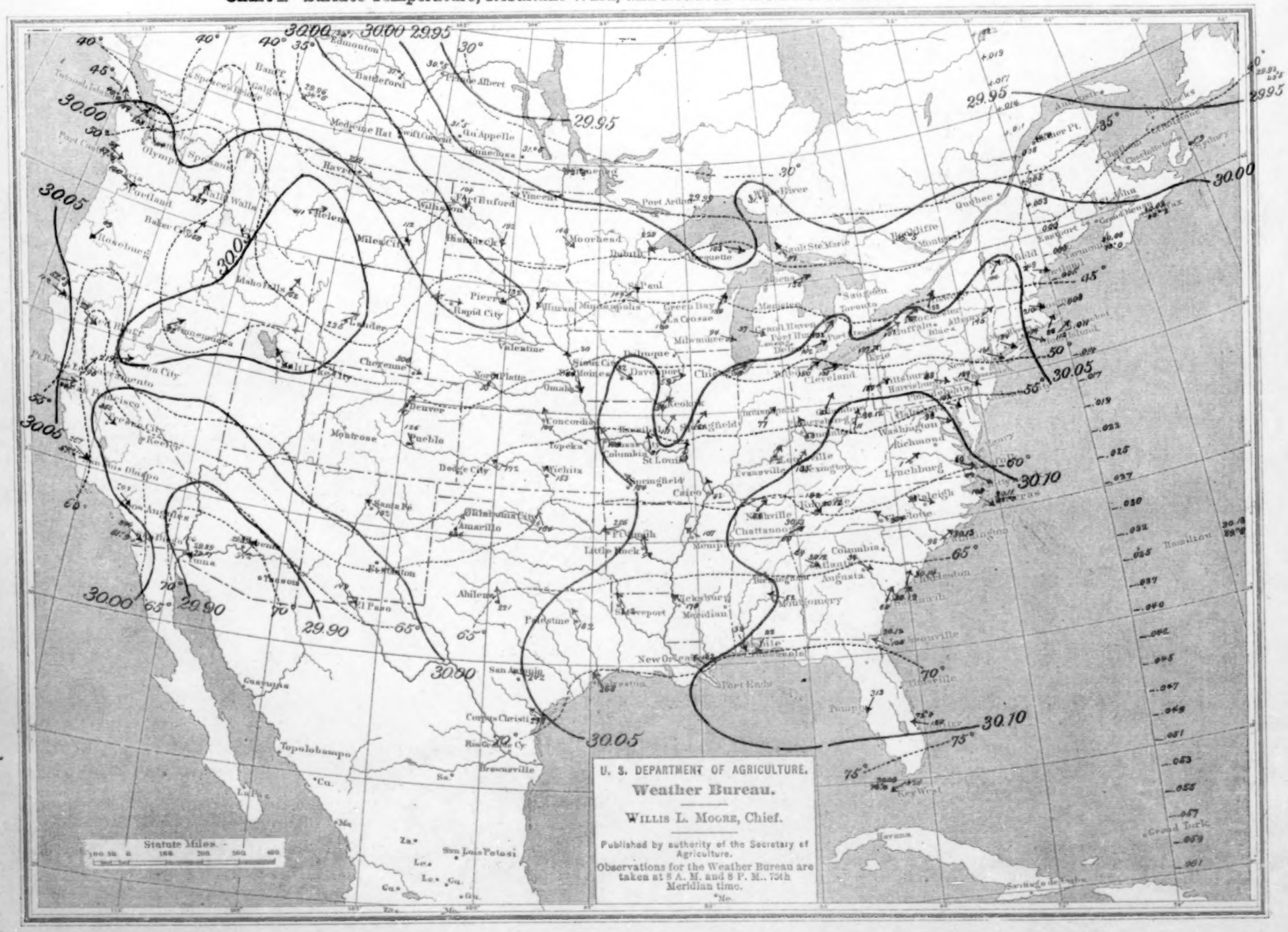
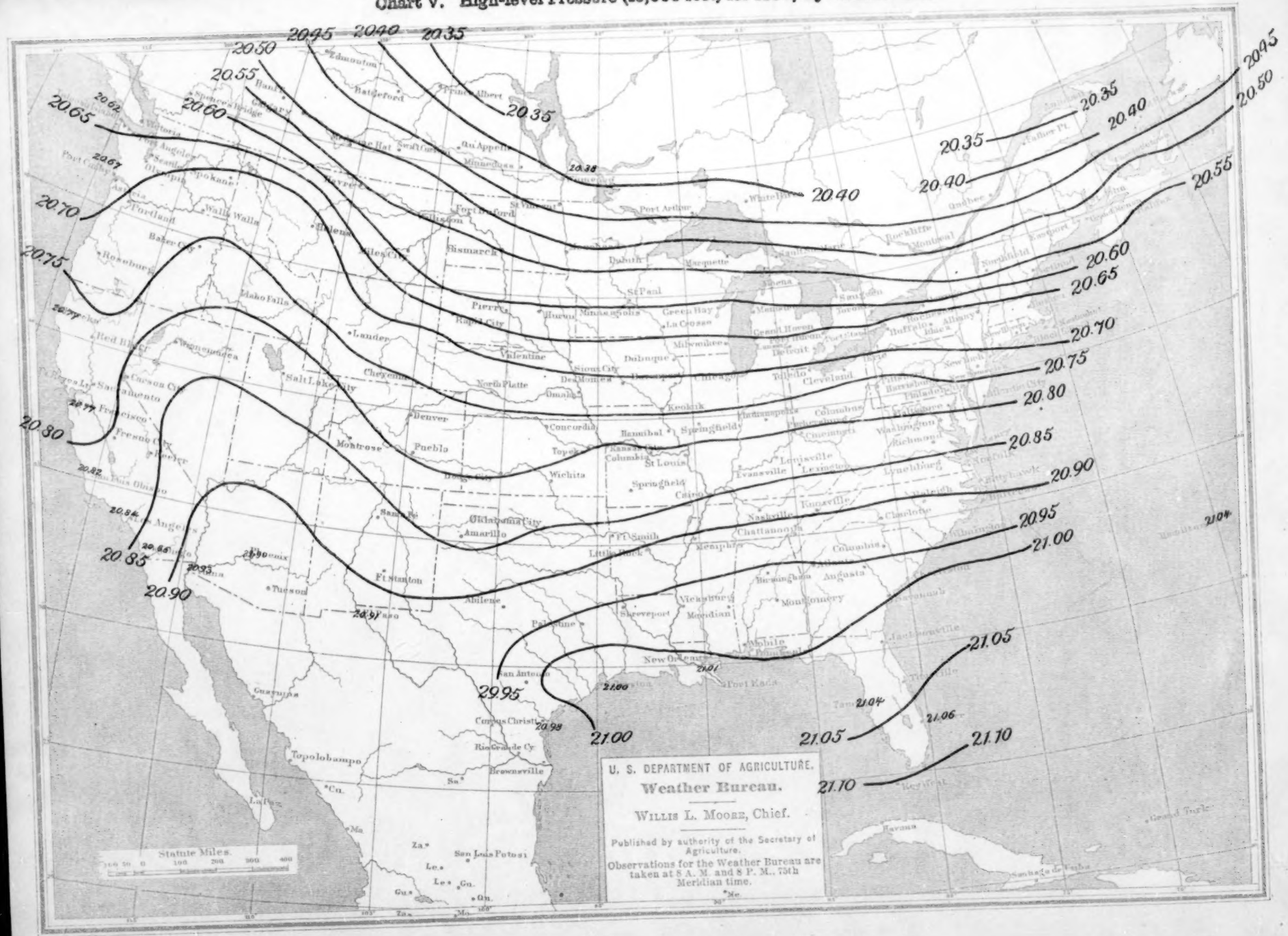


Chart V. High-level Pressure (10,000 feet) for 1896; by Park M[illegible].



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